Divergent Income Trajectories: How Colonialism Helped the Rich and Hindered the Poor

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Table of Contents

Abstract

To what extent does time under colonial rule help or hinder the rich and poor today? Though there is ample literature on the adverse effects of colonialism on economic development (Lange et al. 2006, Mahoney 2010, Acemoglu et al. 2001) and its positive effect on income inequality (Engerman and Sokoloff 2006, Mizuno and Okazawa 2009), discrepancy exists between the mechanisms behind negative effects and the extent to which they pervade postcolonial societies. Contrarily, some scholars observe a positive empirical relationship between colonialism and development; Feyrer and Sacerdote (2009) find a positive association between length of colonial rule and income in 2000 for a set of island nations. Using a broadened cross-national sample of former colonies, the present study argues that length of colonial rule has distinct effects on income trajectories for upper versus lower classes. I find a significant positive relationship between the percentage of income earned by the rich in 2000 and length of colonial rule. Conversely, I find a negative association between the percentage of income earned by the poor in 2000 and length of colonial rule. Increased time under colonial rule led to a higher frequency of extractive institutions, which served the interests of colonial administrators over natives. Extractive institutions were then adopted into post-independence policies which directly affect the present-day income distribution. These results reveal how the positive association between colonialism and economic development in Feyrer and Sacerdote's (2009) study are driven by heightened income for the upper elite class, masking the negative economic effects of colonial institutions on the poor.

Keywords: Development, income, inequality, colonialism.

I. Introduction

From 2010 to 2013, Forbes Magazine pegged Carlos Slim Helú as the richest man in the world (Forbes 2021). One would expect Helú to hail from a developed, high-income country, yet Helú comes from Mexico, owing his considerable fortune to a Latin American telecom company and extensive shareholdings in Mexican firms (Forbes 2021). The same year Helú topped the notorious list for the consecutive time, the Los Angeles Times ran the headline, "Poverty grew in Mexico to nearly half the population" (Wilkinson 2011). While Helú enjoyed plentiful economic success of the highest caliber, almost half of his fellow countrymen lived below the national poverty line, many with insufficient access to basic necessities (Wilkinson 2011). What factors influence the wealth accumulation of a select few while the majority of citizens struggle to earn meager income? This issue is certainly not limited to the former Spanish colony; rich tycoons and elite classes of super-wealthy emerge around the world. Scholars have long postulated theories as to why some countries experience economic prosperity while others stagnate, yet many forgo income discrepancies within the country itself.

History has a causal and significant impact on economic outcomes today (Nunn 2009); colonialism, a critical juncture in history, has been identified as causal mechanism behind modern day income inequality (Engerman and Sokoloff 2006, Mizuno and Okazawa 2009). A key determinant of long-run income inequality is the distribution of land, which varied greatly across former colonies (Frankema 2010). There is debate in the literature on whether the distribution of colonial land (and the subsequent wealth accompanying land ownership) was a result of factor endowments or colonial institutions (Frankema 2010). Easterly (2007) asserts that geographic characteristics endowed some countries with a suitable climate for cash crops, and subsequently experienced higher levels of income inequality due to increased use of slave and native labor. Alternatively, North et al. (2000) argue that land distribution was determined by the

preferences of the colonial administration; British colonial administration's favored and established strong property rights for the majority of the populace, while Spanish colonial administration's used a quid pro quo system of supporting the elites and church to determine land acquisition (North et al. 2000). The Spanish system is consistent with Acemoglu et al.'s (2001) definition of extractive colonial institutions, which encouraged long-run inequality by creating an elite group of settlers or favored natives who enjoyed economic, political, and social benefits which the bulk of the indigenous populace failed to receive. Extractive institutions were not limited to Spanish colonies; British colonies in the Caribbean and Southern United States experienced nearly identical treatment of natives in comparison to their Spanish neighbors (Frankema 2010). Subsequently, benefits for elites regardless of colonial identity persisted after independence through government policies, such as the extent of enfranchisement (Engerman and Sokoloff 2000) or failure to correct land ownership restrictions (Iyer 2010). I expect that the longer a country spent under colonial rule, the more pervasive its colonial extractive institutions, since settlers had increasing amounts of time to establish governance systems and extract benefits from the native populace. Though the institutions are no longer operational today, the detrimental effects of extractive institutions on the lower marginalized class continue after independence via policy choices. Regressive policies, such as preventing the non-landed or illiterate population from voting, contribute to modern-day divergence in income.

This study asserts that colonialism has distinct effects on income trajectories for the upper versus lower classes. With the expectation that the effects of extractive colonial institutions persist via policies that encourage income inequality today, I expect colonial rule to be positively associated with the present-day incomes of the rich, and negatively associated with present-day incomes of the poor. Prominent research on the importance of colonialism to long-run development ignores the discrepant effects of colonial institutions on different socio-economic

groups (Feyrer and Sacerdote 2009). Feyrer and Sacerdote (2009) find a positive overall relationship between length of time under colonial rule and income in 2000 within a sample of island nations. The positive association remains robust to geographic controls and an instrumental variables test, and the authors allege that results hold within a larger sample of Spanish and British colonies (Feyrer and Sacerdote 2009). By contract, I argue that while their results tentatively hold in a larger sample of former colonies, the positive association between length of time under colonial rule and modern income is driven by the incomes of the rich, while the incomes of the poor decline under longer colonial administration. Adapting their regression analyses and sample, I test my hypothesis by regressing the length of time a country was under colonial rule on the percentage of income earned by the top twenty percent of citizens and bottom twenty percent of citizens in 2000. Employing an original dataset of 105 former colonies, I find a significant positive association between the number of centuries a country was colonized and the percentage of income earned by the top quintile. Conversely, I find a significant negative relationship between the number of centuries a country was under colonial rule and the percentage of income earned by the bottom quintile. These relationships remain robust to a variety of geographic and institutional controls. To account for post-treatment bias in controls, additional institutional variables are analyzed in a sub-sample of the data to illustrate that results remain significant.

Additionally, I anticipate the identity of the colonizer to be associated with the incomes of the rich and poor; extractive Spanish colonialism, though generally believed to negatively impact modern income, favored the white elite of the population who set up permanent political and economic institutions to serve their interests (Lange et al. 2006). The Spanish also increasingly dominated areas of high disease prevalence, leading to higher settler mortality rates and increased extractive institutions (Acemoglu et al. 2001). Henceforth, I hypothesize that

Spanish colonial rule was positively associated with incomes of the rich, and negatively associated with incomes of the poor. Similarly, I hypothesize that British "inclusive" institutions, generally categorized as conducive to growth (Lange et al. 2006), mask disparate effects on indigenous peoples, as many British colonies in the Caribbean subjugated colonial subjects to harsh labor conditions and confined them to low levels of society (Coatsworth 2008). However, when the length of time a country was under colonial rule is disaggregated by colonial identity, the only channel by which colonial identity strongly predicts disparate economic outcomes is Spanish colonialism. No other effects of colonial identity on the percentage of income earned by the rich and poor are found in my sample.

My analysis pinpoints a heterogeneity in Feyrer and Sacerdote's (2009) widely cited article by illustrating how the positive association between colonial rule and income is driven by the upper class, while the lower class remains poorer on average. My results also add a quantitative component to Engerman and Sokoloff's (2006) work on colonialism and inequality, which forgoes regression analysis. I provide statistical analysis to support their argument that colonialism is associated with higher incomes for the rich, and lower incomes for the poor. Furthermore, I identify the exact effect by which length of colonialism impacts modern income for two opposite ends of the income spectrum, instead of using the GINI coefficient as many analyses of income inequality choose (Frankema 2005, Angeles 2007, Cornia 2014). Increased specificity helps us better understand the ways in which inequality pervades postcolonial states today by identifying its exact effect on different economic stratifications.

Section II of this paper presents a review of literature contextualizing my argument that colonialism causes a divergence in income trajectories through its pervasive institutions. Section III introduces theory to support my hypothesis that increased time under colonial rule is positively associated with income of the upper class, and negatively associated with income of

the lower class. Section IV presents cross-sectional data collected and implemented in analysis with justifications for selected controls; a brief discussion of research specifications follows in Section V. Section VI presents main findings with various regression tables. Section VII discusses strengths and weaknesses of the cross-national analysis and provides insight into further study. Section VIII concludes.

II. Literature Review

Before delving into theory, it is crucial to examine the causal factors which influence economic development and how they relate to income inequality. I present a discussion of proximal and fundamental determinants of economic development, including colonial rule, in order to provide empirical support for my argument that the adverse economic effects of extractive institutions persist in the long run through regressive policies. Moreover, the discussion of development determinants below justifies my choice of indicator variables in later regression analysis.

Seminal development literature of the modern era asserted that geography was the primary culprit of differences in country incomes (Sachs 2001, Gallup et al. 1999). Jeffrey Sachs' influential work *Tropical Underdevelopment* (2001) corroborated that countries in tropical zones were far poorer than countries in their temperate counterparts due to inadequate production technologies. Technological innovation, the catalyst for long-run sustainable development as evidenced through the Solow (1956) and Romer (1989) models, was largely lacking in agriculture and health (Sachs 2001). A rife disease environment without proper investment in health makes people inherently unproductive, while stagnation in agricultural technology leads to a shortage of food; subsequently, basic needs of the populace fail to be met (Sachs 2001). As mentioned previously, Easterly (2007) argues that geography affects income inequality through soil suitability; former colonies with ideal soil for cash crop production had higher levels of

inequality than colonies suited for cereal crops. Model conditions for cash crops occur in the tropics, areas which already experience hampered development (Sachs 2001, Gallup et al. 1999). This is one avenue by which geography not only affects aggregate income, but also shapes the income distribution within a country. The book *Guns, Germs, and Steel* (Diamond 1997) championed this geography hypothesis to the general public; though there is truth to Diamond's (1997) claims, geography is only a proximate cause of economic development and should not be the only determinant emphasized.

A similar vein of thought postulates that access to trade can explain differences in economic development outcomes (Gallup et al. 1999, Sachs and Warner 1995). Being landlocked or far from a port is associated with lower national income because transportation costs prevent the diffusion of goods and ideas which benefit aggregate welfare (Gallup et al. 1999). It is logical to conclude that high transportation costs would be most harmful to the poor, since their willingness to pay for essential items or investment is heavily restricted by their income. Conversely, the rich would more likely to bear high transportation costs to attain necessary goods, since they can afford to pay. Henceforth, trade access may also shape the income distribution as the poor fail to attain necessary goods and services that the rich can pay higher prices to acquire. Trade policy is also integral to a country's development; economic convergence can be evidenced in countries with trade liberalization policies, while economic divergence occurs in countries with closed economies (Sachs and Warner 1995). Since the trade explanation for development centers around proximity and accessibility to markets, the hypothesis is closely entwined with the geographic explanation, which together comprise the proximal determinants of development.

Yet both of these explanations fail to account for differences in development over time; indigenous civilizations such the Mali or Inca Empire flourished at low latitudes, in areas

supposedly not conducive to economic prosperity and in remote locations (Mahoney 2010, Acemoglu, Johnson and Robinson 2001). The difference between the thriving resource endowed empire of the Andes and the stagnant growth of present-day Bolivia and Peru is their institutions. North (1990) broadly defines institutions as rules which govern human interaction; they may be informal social norms, or formal laws and declarations. The institutional hypothesis states that institutions (economic, political, and social) explain disparate development outcomes between countries, and are fundamental determinants of long-run growth (North 1990, Rodrik et al. 2004, Acemoglu et al. 2001, Hall and Jones 1999). Even when controlling for a country's proximity to markets, being landlocked, or being at low latitudes, the institutional hypothesis holds, and nullifies the significance of proximal determinants (Rodrik et al. 2004). Continuing with the example of the Inca Empire, economic and societal institutions of their (and many other) indigenous societies were shaped by indigenous people prior to colonial contact, whereas after the arrival of Europeans, institutions were crafted to serve the interests of the colonizing nation. Colonial settler preferences varied greatly from the preferences of natives, and erected institutions served the preferences of the colonial administrator. This idea is integral to my rationale that increased time under colonial rule led to the establishment of extractive institutions, which are associated with divergent income trajectories today through their integration into government policy. It is evident in the literature that while institutions shape aggregate economic outcomes, they also affect the distribution of income.

The institutional argument is the foundation of Acemoglu, Johnson and Robinson's (2002) reversal of fortune theory, which states that countries rich prior to colonial contact experienced a decline in economic growth after colonial rule, while countries poor at colonial contact experienced increased economic growth after colonial rule. The explanation behind this phenomenon is that institutions erected in areas affluent before colonial contact were inherently

extractive, since colonists were keen on siphoning the material wealth of the colony back to the home state. On the contrary, inclusive institutions which spurred growth were implemented in poor colonies, since Europeans encouraged investment there in hopes of turning the colony into a miniature version of their home nation. Lange et al. (2006) challenge this theory by accounting for the identity of the colonizer, categorizing British colonialism as inherently liberal (satisfying the presence of inclusive institutions for growth) and Spanish colonialism as mercantilist (including predominantly extractive institutions unsuited for long term growth). Consequently, one would expect that countries with inclusive institutions would have less inequality today, since their colonial society was molded after European society, and property rights were more equitably distributed (Lange et al. 2006). However, inclusive institutions were not uniformly implemented across a colonial power's territories; although the British successfully transmitted their institutions to countries such as the United States or Australia, countries in the Caribbean did not receive the same treatment (Frankema 2010). I test this idea in later sections by examining the effect of colonial identity on the incomes of the upper and lower quintiles today, to determine if certain colonial powers implemented more inclusive or extractive institutions relative to others.

Although institutions are fundamental determinants of a country's economic success or failure, the beneficiaries of colonial institutions are not homogenous across populations. Income inequality has persisted in former colonies today (Engerman and Sokoloff 2006, Sokoloff and Engerman 2000, Mizuno and Okazawa 2009, Milanovic 2016, Banerjee and Iyer 2005) as a result of lingering institutions which hinder economic growth for the lower, largely indigenous class and encourage growth for the upper, predominantly white class. The more unequal a country is, the lower its income growth becomes (Easterly 2007). Engerman and Sokoloff are pioneering scholars on the topic of colonialism and inequality, illustrating how the

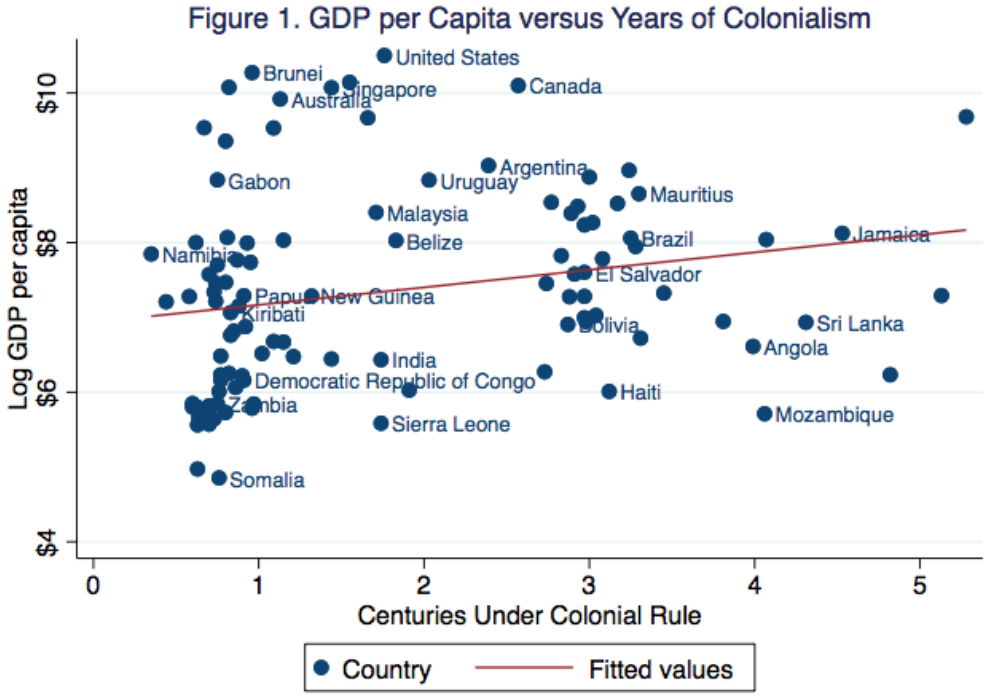
heightened human and physical capital of white settlers advantaged them in comparison to natives (2006). Erected institutions then reflected this disparity in societal structure, which hampered economic growth. For example, in areas of Peru where Spanish colonists built and operated *mitas*, mining labor camps for indigenous Peruvians, consumption today is significantly lower than in areas that never had *mitas* (Dell 2010). Although the *mitas* no longer utilize native slave labor, the residual economic effects of indigenous oppression remain evident, as post-independence policies failed to correct the negative implications of the *mita* system on indigenous people.

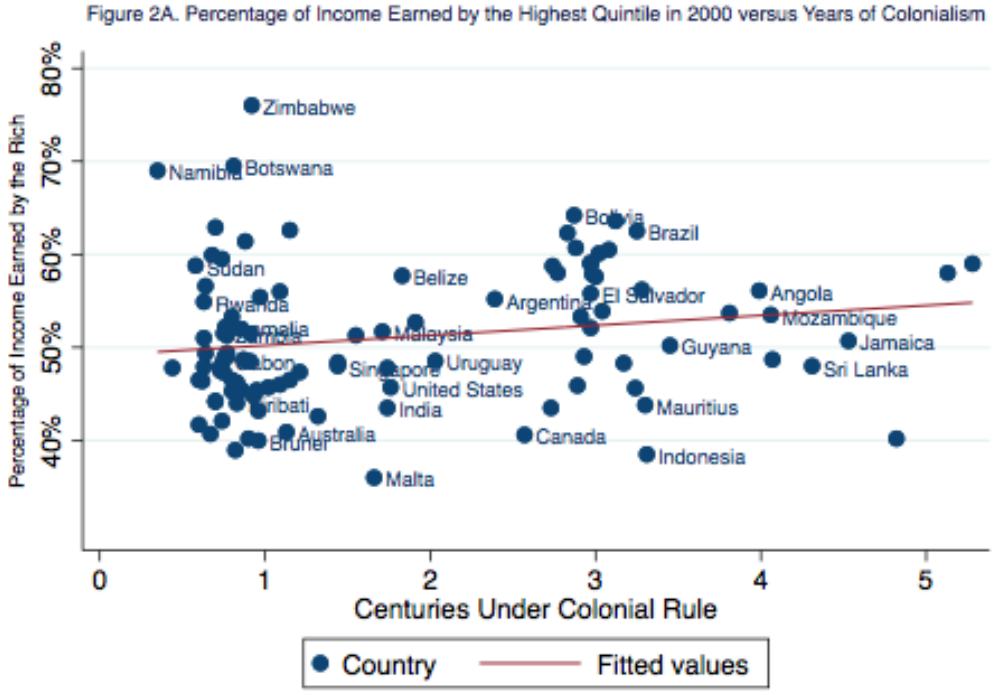
Conversely, colonial institutions have been associated with long term positive effects on development. Dell and Olken (2020) find that areas of Java where the Dutch administered sugar cultivation plantations have higher consumption and levels of industrialization today. This illustrates how colonial institutions were not uniformly positive or negative, and supports Engerman and Sokoloff's call to action that more study on the topic is necessary. If colonialism creates significant economic inequality between groups, then development studies focused on aggregate income may be masking the effects of colonial rule on certain marginalized groups. A study by Feyrer and Sacerdote (2009) substantiates the positive effects of colonial rule on GDP per capita for a subset of island nations, suggesting that the longer a country was under colonial administration, the higher their national income was in 2000. But who is richer in these countries? The positive relationship between income and colonialism could be a reflection of the high capital accumulation by descendants of white settlers, concealing the detrimental effects of colonial institutions on the indigenous poor. Unlike Feyrer and Sacerdote's (2009) study, which focuses on a subset of islands, I expand their sample to 105 former colonies and disaggregate GDP into the percentage of income earned by the top and bottom quintiles to determine if their positive results still hold in both income brackets. Because the literature identifies colonialism as

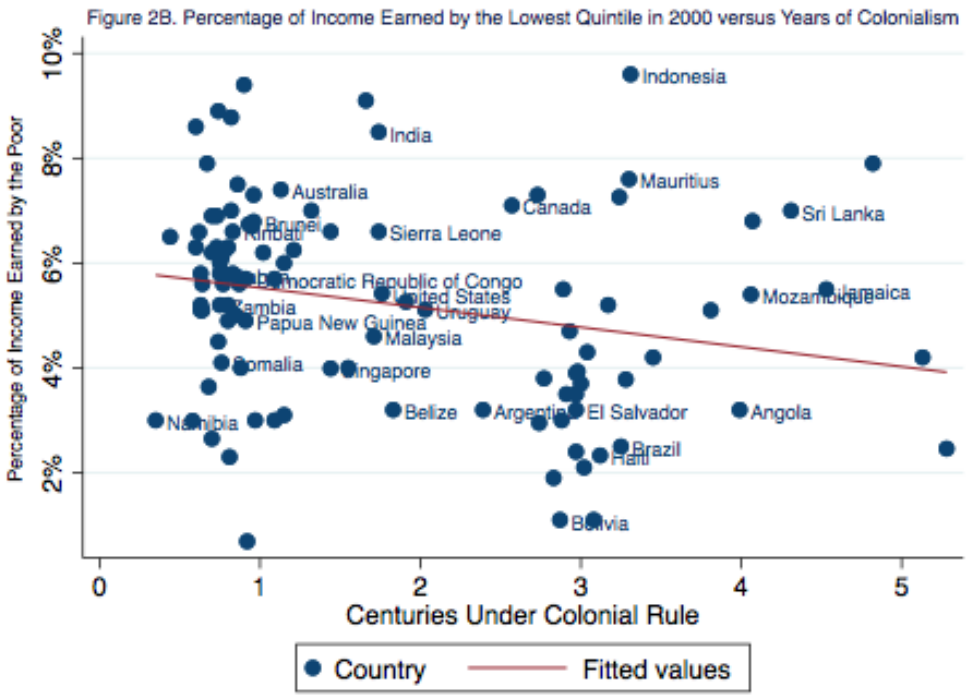
a causal mechanism of income inequality in modern postcolonial states (Engerman and Sokoloff 2006, Mizuno and Okazawa 2009, Milanovic 2016, Banerjee and Iyer 2005), I anticipate a positive relationship between length of colonial rule and the percentage of income earned by the rich, and a negative relationship between length of colonial rule and the percentage of income earned by the poor.

Presented below are simple correlations between the amount of time a country was under colonial and its income levels today. Figure 1 illustrates the positive relationship between log GDP per capita and income in year 2000 in former colonies. Consistent with Feyrer and Sacerdote (2009), there is a positive overall relationship between national income and centuries under colonial rule. Figures 2a and 2b examine the correlation between length of colonial rule and income brackets on opposite ends of the distribution. The y-axes indicate the percentage of national income earned by the top 20 percent of a country's citizens, and the percentage of national income earned by the bottom 20 percent of a country's citizens. Figure 2a shows that the positive relationship holds when examining the correlation between the percentage of income earned by the rich and time under colonial rule. However, Figure 2b depicts a negative correlation between the percentage of income earned by the poor and years under colonial rule. When expanding beyond Feyrer and Sacerdote's (2009) limited sample of islands, I observe the relationship they posit for the richest quintile of citizens, who hold higher income on average the longer their nation experienced colonial rule. However, upon examining the poorest quintile of citizens, I observe an opposing relationship to the one found by Feyrer and Sacerdote (2009): the longer a country was colonized, the less income is earned on average. This suggests that Feyrer and Sacerdote's (2009) assertion that the relationship between colonialism and modern income is positive masks the disparate effects of colonialism on the rich and poor. By disaggregating GDP into the percentage of income earned by the top twenty percent of citizens and the bottom twenty

percent of citizens, I use regression analysis below to identify the specific effect of length of time under colonial rule on the rich and poor.

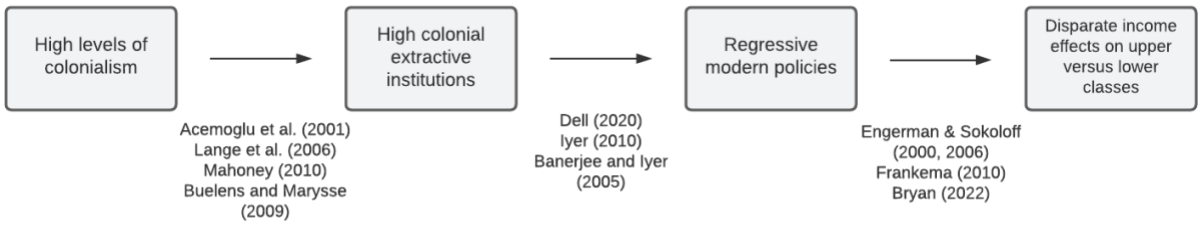






III. Theory

Figure 3 – Channels by Which Colonialism has Heterogenous Effects on Upper versus Lower Classes



Why do we observe a positive empirical relationship between the length of time a country was colonized and incomes of the rich and a negative relationship for incomes of the poor? Figure 3 illustrates a flowchart explanation to this question. High levels of colonialism are linked to high presence of extractive institutions (Acemoglu et al. 2006, Lange et al. 2006, Mahoney 2010), which persist in the long-run and lead to regressive policy (Dell 2010), subsequently creating disparate economic effects on the upper versus lower classes (Engerman and Sokoloff 2000,

2006, Mizuno and Okazawa 2009). Using several pieces of widely-cited literature (Dell 2010, Iyer 2010, Banerjee and Iyer 2005), I examine both Spanish and British colonies in which the effects of extractive institutions persisted on through regressive policies or policies which failed to sufficiently amend the consequences of colonial decisions. Intuitive reasoning to support each mechanism is discussed below.

High levels of colonialism are strongly associated across a plethora of literature with increased extractive institutions, most notably by Acemoglu et al. (2006) as referenced in above sections. Extractive institutions did not protect private property or prevent colonial administrators from unilaterally expropriating their colonies (Acemoglu et al. 2006, Lange et al. 2006, Mahoney 2010). Conversely, inclusive institutions protected private property and allowed for colonies to become "Neo-Europe's" abroad (Acemoglu et al. 2006, Lange et al. 2006, Mahoney 2010). On average, colonial institutions were inherently extractive to some degree, evidenced by my findings that length of time as a colony is associated with higher inequality across most former colonies today. This implies that extractive institutions in former colonies outnumber inclusive institutions in former colonies, or else the effects of inclusive institutions would offset the effects of extractive institutions. This could also imply that inclusive institutions lead to inequality, however I believe they should be categorized as extractive if this is the case.

Nonetheless, what are extractive institutions exactly? Institutions is a broad term to describe the rules, norms, and laws which govern a society (North 1990). It aids my analysis to specify institutions created by colonial administrations which exhibited extractive properties in order to give concreteness to abstract "institutions". Acemoglu et al. (2006) assert that the Belgian Congo under King Leopold II exemplifies extractive institutions in the colonial context. Indeed, Leopold ruled the region unilaterally, with no political or economic accountability to his colonial subjects (Buelens and Marysse 2009). Unable to tax his people due to extreme poverty

and poor state capacity in the area, Leopold used indigenous Congolese to harvest rubber, copal, and ivory, which he sold on international markets and invested all profits back into domestic Belgium (Buelens and Marysse 2009). The political institution of Leopold's autocracy, the economic institutions which led to colonial revenues being kept far from its native people, and the social institutions which relegated the indigenous to crude labor at the King's expense all coalesce to form extractive institutions.

These extractive institutions then persist on after the termination of colonial rule in the form of regressive modern-day policies. Although the actual extractive institutions of the colonial period are no longer present, the effect of extractive institutions on the populace continues. Dell's (2010) piece on mining *mitas* in Peru exemplifies this: *mitas,* forced labor systems implemented by Spanish colonial administrators, subjugated indigenous Peruvian's to work in silver mines during the colonial period. After Peruvian independence, the new sovereign government abolished the extractive *mita* system, however the state failed to allocate land or property rights to former *mita* workers (Dell 2010). Conversely, those who did not reside in *mita* districts were endowed with property rights, giving their municipal governments (a political institution) heightened ability to invest in public goods (Dell 2010). Despite the *mitas* abrupt elimination after colonial rule which ended the forced labor of indigenous people, the government's policy choices based on previous colonial actions led to regressive economic outcomes in the long run.

Furthermore, the *mita* system solely affected the peasant class (Dell 2010), which supports my subsequent assertion that regressive policies created disparities in income. Consumption in *mita* districts today is still 25 percent lower than in non-*mita* districts, which corresponds to lower average income (Dell 2010). In Peru, the long amount of time spent under Spanish rule allowed for colonial officials to set up these long-term extractive labor systems, which were abolished and replaced by lackluster government policy, contributing to divergence in income trajectories.

Another area which illustrates how extractive institutions were molded after independence is India. Contrary to Lange et al. (2006), who argues that British colonialism had positive effects on long-run institutions, Iyer's (2010) analysis of direct versus indirect rule in India provides textbook evidence of extractive institutions. Indian districts directly ruled by the British had landlord-based revenue systems, which created land-based inequality between landlords (the British) and the cultivators of the land (native Indians) (Banerjee and Iyer 2005). After Indian independence, states were given the right to reform their land systems, and many abolished landlords altogether (Banerjee and Iyer 2005). Despite this, areas under direct rule still have less schools, roads, and healthcare centers (proxies for income in the absence of good data) than indirectly ruled areas without the landlord-based system; however, the difference between direct and indirectly ruled districts is decreasing over time (Iyer 2010). Iyer (2010) indicates that modern-day policies have made efforts to correct the discrepant development outcomes of landlord-ruled areas, yet they have not been successful in bringing about full convergence. This suggests that remedial policies must be aggressive in action against inequality, since directly ruled areas still feel the harmful effects of colonial institutions (the land tenure systems) long after their abolition. Furthermore, in directly ruled areas, the lower class of people likely bear the majority of the externalities of direct rule, since the upper-class can pay for private healthcare, schooling, and high transportation costs without jeopardizing their well-being.

Though already touched upon slightly, the final link between policy and disparate income effects for rich and poor is largely substantiated by the works of Engerman and Sokoloff (2000, 2006), pioneering scholars on the subject of colonialism and inequality. Qualitatively, they assert that unequal economic development outcomes in former colonies today are a product of institutions which benefit an elite set of people, perpetuated through government policy (Engerman and Sokoloff 2000). One institution by which detrimental policies led to unequal

development outcomes was the extent of voting rights during the post-independence period (Engerman and Sokoloff 2000). At the outset of colonial rule, many former colonies limited the franchise to the descendants of colonial settlers, since wealth and literacy requirements excluded those who were not white men with landed property (Engerman and Sokoloff 2000). Lacking political agency, the indigenous and minority poor were unable to demand government accountability for their preferences. Even in democracies, if elites are the sole voters, then government preferences will omit the desires of non-voters, compromising the middle and lower marginalized classes. Government investment in equitable redistribution would be determined by the former colonial administrators or their descendants, who would likely have vastly different preferences than illiterate people without property. In Engerman and Sokoloff's (2000) limited sample, countries which extended voting rights during the post-independence period experienced higher growth than countries slow to abolish franchise requirements. Substantial variation in land ownership policies and franchise requirements exist across former colonies (Frankema 2010); while the United States was quick to delegate property rights to non-white males and eliminate franchise barriers, Caribbean islands such as Barbados did not eliminate property requirements to vote until 1950 (Engerman and Sokoloff 2000).

Overall, this analysis supports my hypothesis that increased time under colonial rule for a wide sample of former colonies is associated with greater income earned by the upper class, and decreased income earned by the lower class. The posited negative relationship between length of colonialism and the incomes of the lowest quintile can be explained by extractive institutions and accompanying policy; for example, the barriers to land ownership for the lower classes, which were detrimental not only for capital accumulation, but for political agency. As illustrated by Dell (2010), mining *mita* districts prevented residents from acquiring property, which was never adequately corrected after independence. Consequently, residents of Peru and Bolivia in former

mita areas are poorer today than those who live outside of *mita* areas because of their decreased land holdings and because their lack of land prevented them from gaining political agency. Conversely, the expected positive relationship between colonialism and the incomes of the upper quintile can be explained by the same logic, in which the system of land ownership upheld during the colonial period and its political implications did not dissipate after independence.

In summary, I posit that longer time under colonial rule is associated with higher levels of extractive colonial institutions (such as land ownership systems and enfranchisement), which are then internalized through government policies over time, leading to different effects on the percentage of income earned by the rich versus poor.

IV. Data

To examine the effect of the length of colonial rule on incomes of the poor and rich today, I employ a regression analysis with an original dataset using the percentage of income earned by the upper and lower quintiles in former colonies in the year 2000. Existing datasets contain some necessary variables in my analysis; however, due to the scope of chosen development indicators, two dependent variables, and differing measures of colonialism, I created a novel dataset for straightforward analysis.[1] Feyrer and Sacerdote's (2009) original data contains observations from island nations and provinces, however disaggregated income data from this sample was unavailable for over half of country cases. By broadening their sample size to a global selection of countries, disaggregated income data became available and analysis remains largely uncompromised. Feyrer and Sacerdote's (2009) primary reason for island selection was to instrument for length of time under colonial rule using wind speed. While their use of just 81 islands facilitates their instrumental variables analysis, it raises external validity concerns which I mitigate by expanding their sample to 105 former colonies which are sovereign

[1] A copy of my dataset is provided in the Appendix.

nations today (with the exception of Puerto Rico and Hong Kong, which are included as individual observations). Islands are smaller in population and area in comparison to landed countries (among many heterogeneities), which may account for institutional variation between their sample and the majority of non-island colonies. Henceforth, Feyrer and Sacerdote's (2009) findings are less generalizable to landed areas, where a majority of people live.

One may be concerned that different findings in the present study are due to the novel dataset employed, which expands beyond Feyrer and Sacerdote's (2009) analysis of 81 island colonies. Nominal log GDP per capita is used as a dependent variable (United Nations 2021) to test whether my broader cross-national sample exhibits the same positive association between length of time under colonial rule and income as found by Feyrer and Sacerdote (2009). Table 2 in the later results section shows that their findings tentatively hold when my dataset is used; the positive relationship between log GDP per capita and centuries under colonial rule remains statistically significant in bivariate analysis in my broader global sample. Subsequent results then show that the findings are heterogeneous by income strata, consistent with my theoretical argument. Furthermore, to ensure the accuracy of my own statistical analysis, I replicate the results of Feyrer and Sacerdote (2009), which are included in the appendix.

4.1 Dependent Variable

The primary dependent variables in my analysis are the percentage of income earned by the top twenty percent of citizens and the percentage of income earned by the bottom twenty percent of citizens. Observations are collected from World Bank's World Development Indicators and the World Income Inequality Database (World Bank 2021b, UNU-WIDER 2021). In order to test my novel contribution that colonialism has distinct effects on opposing ends of the income distribution, it is preferable to disaggregate national income into the percentage of income earned by the top and bottom quintiles. By using income quintiles, it is easy to quantify

the exact effect colonialism has on the incomes of the poorest and richest segments of the population, as the data is readily available and is representative of the income distribution.

This measure is preferable to utilizing a country's Gini coefficient,[2] a widely used measure of inequality in the literature (Cornia 2014, Angeles 2007), because the latter measure does not reveal the true shape of the income distribution. Because the Gini coefficient is equal to the area between the income distribution curve and the line of perfect equality, two countries with the same Gini coefficients can have vastly different income distributions (Lamb 2012). While the measure identifies the degree of inequality within a country, it does not accurately portray the income distribution since it reduces it down to a single positive integer. The coefficient is also sensitive to outliers in the data, whereby a small fraction of ultra-wealthy or extremely impoverished people can skew the measure (Lamb 2012). While income quintiles are also subject to bias from outliers, this is less problematic because all outliers are observed within the designated quintile of the income distribution; an extremely rich person will have no impact on the percentage of income earned by the poor, and a handful of extremely impoverished people have no effect on the percentage of income earned by the rich. Due to ease of analysis, clear depiction of the income distribution, and more precise estimates, it is optimal to use the percentage of income earned by the top and bottom quintiles as my dependent variable to measure the extent of inequality in former colonies.

4.2 Independent Variable

The primary independent variable, the number of centuries a country was under colonial rule, is calculated using the difference between the year in which institutional colonial rule started and the year of the country's independence. Time under colonial rule measures the

[2] The area between the income distribution curve (Lorenz Curve) and the curve of perfect equality. Equal to 0 if a country is perfectly equal, equal to 1 if a country is perfectly unequal.

magnitude of colonial institutions; the longer a country experienced colonial rule, the heightened number of extractive colonial institutions were erected by colonial administrators. Colonialism is defined across prominent development literature (Acemoglu et al. 2001, 2002, Lange et al. 2006, Mahoney 2010, Engerman and Sokoloff 2006, 2000) as the prevalence of political, economic, or social hierarchy implemented by colonial administrators on a colonial populace. A variety of sources are synthesized to compute the two years which most accurately reflect the incidence and expulsion of the colonial administration's presence: Feyrer and Sacerdote's (2009) islands data, Lange et al.'s (2006) data on British and Spanish colonies, and Ziltener et al.'s (2016) Colonial Transformation Dataset. Although subjectivity exists amongst scholars on the commencement of colonial rule, I determine that colonial rule begins when a country is declared a colony or protectorate by the colonial administration or when there is an established plurality of settlers living in the colony. Often, the start of colonial rule coincides with the declaration of the country as a protectorate or colony, but sometimes precedes it in countries with high settler presence (Feyrer and Sacerdote 2009, Lange et al. 2006, Ziltener 2016). For consistency, I used the earliest date of colonial inception between the three datasets mentioned above to fit my definition of colonialism.

The number of centuries under colonial rule is also separated by national identity of the colonizer[3] (Lange et al. 2006, Ziltener et al. 2016) to account for the effects of extractive and inclusive institutions identified in the literature (Lange et al. 2016, Mahoney 2010, Acemoglu et al. 2001). Lange et al. (2006) identify Spanish rule as inherently extractive, producing "predatory states, dysfunctional markets … and stratified societies" (pp. 1414); conversely, British rule is identified as inherently inclusive, with, "a rule of law, effective administration, and competitive

[3] i.e. centuries under British rule, Spanish rule, etc.

markets" (pp. 1414). This theoretical framework is contrary to my assertion that all forms of colonialism were innately extractive, so I test their theory by analyzing the effect of length of colonial rule by colonial identity on the percentage of income earned by the rich and poor.

4.3 Control Variables

A range of control variables are included in the dataset to account for other factors integral to development outcomes discussed above. A country's absolute latitude, collected from La Porta et al. (1999), accounts for the geography hypothesis of development, since countries in higher absolute latitudes have higher national incomes than their tropical counterparts (Sachs 2001, Sachs et al. 2001). Similarly, land area (World Bank 2021) accounts for the scale of a nation's physical and human capital[4], both inputs in the long-run production function for economic growth (Solow 1956). The dummy variable for landlocked accounts for both the geography and trade hypothesis of development: landlocked countries experience heightened costs to international trade, as well as geography that deters industry requiring open ocean, such as tourism or shipping (Gallup et al. 1999, Sachs and Warner 1995). Dummy variables for countries in Africa and Asia are included to account for specific regional factors influential to development. Africa is on average poorer than the rest of the world (Bloom et al. 1998), whilst East Asia's former colonies contain growth miracles who defied their poor growth prospects based on geography, such as Hong Kong and Singapore (Bloom and Finlay 2009). Dummy variables for a country's legal origin (French, English, or Socialist) are included as a measure of institutions which favor certain strata of society (Acemoglu et al. 2001). Since most countries in my sample have French or English legal origins, solely French origin is included.[5]

[4] Including their amount of natural resources, another determinant of development (Ross 2015).

[5] French origins are chosen over British ones simply to retain comparability with Acemoglu et al. (2001)'s regressions.

Ethnolinguistic fractionalization, the degree to which a country is homogenous in ethnicity,[6] affects income through various channels. It is negatively related to post-war growth (Rodrik 1999), positively related to corruption which stunts investment (Mauro 1995), and correlated with lower government spending, which implies less redistribution and subsequently higher income inequality (Alesina et al. 1999). Although ethnic fractionalization data is missing for several countries, the omitted observations are not systematically related and thus should not compromise analysis.

One concern of the data is that both ethnolinguistic fractionalization and legal origin capture post-treatment effects, since many factors which occurred after colonization may have influenced a country's choice of legal institution or degree to which different peoples immigrated or emigrated. Acemoglu et al. (2001) note that ethnic fractionalization is inversely related to the formation of centralized markets, which occurred after colonial independence. Neither variable is significant in regression analyses, and further robustness checks use measures of institutions prevalent during the colonial period.

[6] 0 if everyone is the same ethnicity, 1 if everyone is a unique ethnicity.

Table 1 – Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Log GDP per capita	105	7.355	1.334	4.854	10.502
Percentage of Income earned by the Bottom Quintile	105	5.228	1.944	.69	9.6
Percentage of Income earned by the Top Quintile	105	51.075	7.477	36	76.02
Centuries Under Colonial Rule	105	1.798	1.255	.35	5.28
Latitude (Absolute Value)	105	.171	.128	0	.667
Area in millions of square kilometers	105	.758	1.688	0	9.162
Country is in Africa	105	.448	.5	0	1
Country is in Asia	105	.133	.342	0	1
Country is Landlocked	105	.152	.361	0	1
Ethnolinguistic Fractionalization	100	.427	.313	0	1
Has French Legal System	103	.524	.502	0	1
Centuries Under British Colonial Rule	105	.545	.73	0	3.07
Centuries Under Spanish Colonial Rule	105	.578	1.157	0	4.05
Centuries Under French Colonial Rule	105	.253	.468	0	1.86
Ever Colonized by the British	105	.305	.463	0	1
Ever Colonized by the Spanish	105	.152	.361	0	1
Ever Colonized by the French	105	.181	.387	0	1

This table presents summary statistics for variables in my original dataset. All observations for log GDP per capita, the percentage of income held by the bottom quintile, and the percentage of income held by the top quintile are observed in year 2000, or the closest data available to year 2000. Sources and explanations for chosen variables are included in the text.

V. Specifications

The following results section uses Feyrer and Sacerdote's (2009) regression framework as a baseline for my own analysis. By changing their dependent variable, log GDP per capita, to the percentage of income earned by the poor and rich, the model may be employed to examine income inequality. Feyer and Sacerdote's (2009) primary independent variable, length of time under colonial rule, remains the same in my analysis. Control variables for latitude and area are consistent with Feyrer and Sacerdote, however other geographic and institutional determinants of income are added to better fit my cross-national sample. To ensure the comparability of outcomes in my analysis to Feyrer and Sacerdote's (2009) findings, I first replicate their regression results using my original dataset. Henceforth, I adapt Feyrer and Sacerdote's (2009) quantitative framework to separately examine the impact of time under colonial rule on the incomes of the rich and incomes of the poor. Length of time under colonial rule is disaggregated by colonial identity for further institutional specification, and robustness checks are added to

account for post-treatment bias. While Feyrer and Sacerdote (2009) establish a positive relationship between length of time under colonial rule and aggregate income, I illustrate how this relationship is driven by the highest quintile of income earners, masking the negative effect of colonialism on the lowest quintile of earners.

VI. Results

6.1 Feyrer and Sacerdote (2009) with expanded sample

Feyrer and Sacerdote (2009) use a sample of island nations to illustrate the positive association between centuries under colonial rule and aggregate income today; however, this analysis fails to account for how colonial institutions affect the disparate income trajectories of the upper and lower classes, the focus of my study. I illustrate below how this positive relationship holds in my broader cross-national sample to strengthen my assertion that the negative effect of colonialism on the poor is masked by the positive relationship between colonialism and aggregate income, driven by the rich. Analyzing the effect of colonialism on income per capita strengthens my argument that national-level development studies overlook differing institutional effects on marginalized groups of people. This is of particular interest and importance when disadvantaged groups are harmed by institutions which are said to benefit the collective welfare, such as the institutions erected under colonial rule. When colonial administrators established institutions abroad, they operated for the benefit of colonial elite instead of the native populace (Lange et al. 2006, Mahoney 2010, Engerman and Sokoloff 2006). Extractive institutions persisted over time through post-independence policies which affect income. While net positive effects on income are found for the upper classes the longer their nation experienced colonial rule, this relationship is not observed when focusing on the poor. In fact, the opposite is observed: there is a negative relationship between income and length of time

under colonial rule for the lower quintile of the income distribution. As my subsequent analysis illustrates, the latter is observed empirically.

Moreover, broadening the sample in Feyrer and Sacerdote (2009) to a cross-national sample increases the generalizability of findings. Island nations are small in area and population, and may exhibit largely contrasting intrinsic political and economic traits in comparison to landed countries.[7] The broader sample allows for a more persuasive generalization of findings to a greater number of former colonies, since sampled countries vary culturally, politically, and economically with the shared experience of colonial rule and pervasive colonial institutions.

Table 2 shows the effect of colonization and various controls on aggregate income per capita in 2000. The number of centuries a country was under colonial rule is still positively associated with modern per capita income as found in the Feyrer and Sacerdote (2009) island sample. In column 1, each additional century under colonial rule is associated with a 23.4 percentage point increase in GDP per capita. The low measure of fit suggests that many other factors affect income, which is evident in column 2. When geographic controls are applied to the regression, this relationship becomes negative, but fails any test of significance. Unsurprisingly and consistent with the literature, African and landlocked former colonies on average experience lower income per capita today (Gallup et al. 2009, Sachs et al. 2001). Former colonies in Asia also experience a decline in income per capita, however this becomes insignificant once institutional controls are added in Column 3. Empirically, we see no effect of the degree of ethnic diversity on a country's income in the long run. Results using my cross-national sample tentatively support Feyrer and Sacerdote's (2009) positive correlation between income per capita and time under colonial rule; the significant positive association between national income and

[7] For example, an increased reliance on imports, increased vulnerability to natural disasters, less prevalent disease environment, etc.

length of time under colonial rule is only present in my broadened sample when employing bivariate analyses.

Table 2. Log GDP per capita Regressed on Years of Colonization

	(1) Log GDP per Capita	(2) Log GDP per Capita	(3) Log GDP per Capita	(4) Log GDP per Capita
Centuries Under Colonial Rule	0.234*	-0.0757	0.0194	
	(0.0940)	(0.0957)	(0.105)	
Absolute Value of Latitude		2.126*	2.379*	2.352**
		(0.872)	(0.943)	(0.893)
Area in Millions of Square Kilometers		0.100	0.101*	0.101*
		(0.0516)	(0.0487)	(0.0481)
Country is in Africa		-1.504***	-1.257***	-1.280***
		(0.218)	(0.243)	(0.209)
Country is in Asia		-0.526	-0.448	-0.448
		(0.454)	(0.480)	(0.478)
Country is Landlocked		-0.746***	-0.714***	-0.722***
		(0.220)	(0.208)	(0.198)
Ethnolinguistic Fractionalization			-0.120	-0.126
			(0.354)	(0.350)
Country has French Legal Origin			-0.302	-0.287
			(0.174)	(0.176)
Constant	6.934***	7.909***	7.755***	7.802***
	(0.228)	(0.326)	(0.420)	(0.277)
Observations	105	105	100	100
Adjusted R^2	0.039	0.442	0.445	0.451

Standard errors in parentheses.
Source: Original dataset compiled by author, employing data from the United Nations Statistics Division (2021), World Bank's World Development Indicators (2021b), United Nations University World Institute for Development Economics Research (2021), World Bank Agriculture and Rural Development Indicators (2021), La Porta et al. (1999), Feyrer and Sacerdote (2009), Lange et al. (2006), and Ziltener et al. (2016).
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

6.2 Analyses by Income Strata

In order to distinguish the effect of colonialism on the rich and poor instead of the aggregate population, I separate the dependent variable into the percentage of income earned by

the top quintile and bottom quintile. By differentiating income by strata, further analysis reveals how the positive relationship between log GDP per capita and length of time under colonial rule is driven by the incomes of the rich. Table 3A illustrates the effect of colonial rule on citizens in the top quintile of the income distribution. The positive association matches the direction of the relationship found by Feyrer and Sacerdote (2009) between income and length of colonialism for their island sample, as well as in my own bivariate analysis using log GDP per capita as a dependent variable. Column 1 indicates that for each century a colony was under colonial administration, the percentage of income earned by the rich in 2000 increased by 1.08 percentage points; however, the relationship narrowly fails significance. Nonetheless, the positive relationship becomes statistically significant when controls for geography and institutions are added in columns 2–3. When solely accounting for geographic determinants, an additional century under colonial rule corresponds to a 1.71 percentage point increase in the percentage of income earned by the richest quintile. When accounting for geographic and institutional determinants, each added century under colonial rule is associated with a 1.64 percentage point increase in the percentage of income earned by the rich. Given that the richest quintile earns 51.1 percent of a country's income on average, this effect is marginal yet still significant and positive. In proportional terms, this effect represents a 3.2 percent increase in earned income for each century a country was under colonial rule.

As hypothesized, the positive association between colonialism and the incomes of the rich does not hold when examining the incomes of the poor. Table 3B presents main findings on the effect of colonial rule on the lowest income quintile of the population. Column 1 shows that for each century a country was under colonial administration, the percentage of income earned by the poor in 2000 decreased by -.376 percentage points. This relationship remains statistically significant in columns 2 and 3 when geographic and institutional are added; accounting for both

geographic and institutional variables is associated with a -.372 percentage point reduction in the percentage of income earned by the poor for each additional century under colonial rule. This is effect is not only significant at the 95 percent confidence level, but is substantial in magnitude considering that across the overall sample, the poorest quintile receives merely 5.2 percent of a country's income on average. In proportional terms, the effect on the lowest quintile represents a 7.2 percent decrease in the percentage of income held by the poor for each additional century under colonial rule. This means that the percent decrease in income from longer colonial rule is larger in magnitude for the poor than the percent increase in income for the rich. This relationship supports my hypotheses that length of time under colonial rule has a positive effect on the incomes of the rich, and a negative effect on the incomes of the poor. Furthermore, statistical results support my theoretical argument that the number of centuries under colonial rule accurately predicts the level of extractive institutions, which then proliferate over time through modern policies to have persistent negative effects on income for the poor.

Other determinants of development also affect income inequality as illustrated through significant control variables. Being in Asia is significantly associated with over a 5 percentage point reduction in incomes of the rich, however this relationship is likely spurious due to the limited number of Asian countries in the sample[8]. The much-cited literature on geography and development (Sachs et al. 2001, Sachs 2001, Gallup et al. 1999) asserts that higher latitudes yield higher incomes, however in this model coefficients on latitude are positive yet insignificant. This is consistent with the institutional hypothesis that institutions matter for development more than geographic determinants (Rodrik et al. 2004); in this case, the institutions erected by colonial administrators matter more for long-run development than externalities from climatic and topographic attributes of former colonies. The upper quintile of people in landlocked countries

[8] Only 16 out of 113 countries in the sample are in Asia.

Table 3A. Percentage of Income Held by the Highest Quintile Regressed on Years of Colonization

	(1) Highest Income Quintile	(2) Highest Income Quintile	(3) Highest Income Quintile	(4) Highest Income Quintile
Centuries Under Colonial Rule	1.076	1.709**	1.635*	
	(0.566)	(0.616)	(0.655)	
Absolute Value of Latitude		-4.919	-4.979	-7.265
		(5.467)	(5.984)	(6.195)
Area in Millions of Square Kilometers		-0.229	-0.246	-0.223
		(0.470)	(0.487)	(0.501)
Country is in Africa		-0.604	-1.380	-3.313*
		(1.616)	(2.107)	(1.618)
Country is in Asia		-5.439***	-5.306**	-5.356**
		(1.535)	(1.837)	(1.880)
Country is Landlocked		7.730***	7.789**	7.082**
		(2.263)	(2.316)	(2.375)
Ethnolinguistic Fractionalization			1.621	1.072
			(2.559)	(2.506)
Country has French Legal Origin			0.298	1.563
			(1.672)	(1.619)
Constant	49.14***	48.83***	48.56***	52.51***
	(1.305)	(1.661)	(2.071)	(1.738)
Observations	105	105	100	100
Adjusted R^2	0.023	0.202	0.182	0.141

Table 3B. Percentage of Income Held by the Lowest Quintile Regressed on Years of Colonization

	(1) Lowest Income Quintile	(2) Lowest Income Quintile	(3) Lowest Income Quintile	(4) Lowest Income Quintile
Centuries Under Colonial Rule	-0.376*	-0.404*	-0.372*	
	(0.155)	(0.166)	(0.179)	
Absolute Value of Latitude		2.492	2.584	3.103
		(1.425)	(1.508)	(1.573)
Area in Millions of Square Kilometers		0.00473	0.00563	0.000355
		(0.102)	(0.103)	(0.108)
Country is in Africa		0.810	0.955	1.394**
		(0.421)	(0.568)	(0.452)
Country is in Asia		2.056***	1.981**	1.992**
		(0.547)	(0.630)	(0.617)
Country is Landlocked		-1.705***	-1.708**	-1.548**
		(0.492)	(0.514)	(0.534)
Ethnolinguistic Fractionalization			-0.210	-0.0853
			(0.687)	(0.673)
Country has French Legal Origin			-0.136	-0.424
			(0.413)	(0.405)
Constant	5.904***	5.149***	5.160***	4.262***
	(0.306)	(0.458)	(0.587)	(0.475)
Observations	105	105	100	100
Adjusted R^2	0.050	0.251	0.234	0.204

Standard errors in parentheses.

Source: Original dataset compiled by author, employing data from the United Nations Statistics Division (2021), World Bank's World Development Indicators (2021b), United Nations University World Institute for Development Economics Research (2021), World Bank Agriculture and Rural Development Indicators (2021), La Porta et al. (1999), Feyrer and Sacerdote (2009), Lange et al. (2006), and Ziltener et al. (2016).

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

hold on average 7 percentage points more income than those in the upper quintile who do not live in landlocked countries, contrary to literature which deems coastal inaccessibility detrimental for all (Sachs et al. 2001, Gallup et al. 1999). This suggests that amongst former colonies, being landlocked had significant positive effects on the rich while detrimentally affecting the poor, leading to not just less aggregate income but a more unequal income distribution as well.

After establishing the positive relationship between length of time under colonial rule and the percentage of income earned by the rich and the negative relationship between colonialism and the percentage of income earned by the poor, it is useful to examine the effect of colonial identity on differing income strata. A large literature suggests the importance of colonial identity to present-day development outcomes (Lange et al. 2006, Mahoney 2010), which I find in subsequent results. Tables 4A and 4B present the impact of colonial identities on the incomes of the poor and rich today, omitting centuries not colonized to prevent multicollinearity. Dummy variables are added to control for fundamental differences in the location colonial powers chose to conquer; additionally, the variables control for the level of colonialism regardless of time under colonial rule.[9]

Examining Table 4A, I find significant positive effects of centuries under Spanish rule on the incomes of the top quintile when accounting for constant colonial identity. Without dummy variables for the identity of colonizers, each additional century spent as a Spanish colony is associated with a 3.1 percentage point increase in the percentage of income earned by the highest quintile. This relationship only strengthens when dummy variables for the identity of the colonizer are added, to a 3.4 percentage point increase in the percentage of income per century under colonial rule. This relationship is consistent with the association found above that length of time under colonial rule had a positive effect on the percentage of income held by the highest

[9] Dummy variables included in colonial identity regressions in Feyrer and Sacerdote (2009) research design.

quintile of the population, a marginal effect given that the rich hold 51.1 percent a country's income on average, but positive and significant nonetheless. Moreover, this relationship is consistent with the literature (Lange et al. 2006, Mahoney 2010) and my hypothesis that extractive colonialism benefitted an elite group of people who continue to reap economic benefits of extractive institutions today through post-independence policies.

Column 1 of Table 4B reveals that Spanish colonialism also had a significant effect on the percentage of income earned by the lowest quintile. For each century a country was a Spanish colony, the percentage of income earned by the poor was on average -.827 percentage points lower than former colonies which never had Spanish administrations. This relationship is incredibly strong, exhibiting 99.9 percent confidence, and larger in magnitude than the effect found in Table 2B. When dummy variables are added for colonial identity in Column 2, the relationship between centuries Spanish and income of the poor remains significant, explaining a -.817 percentage point decrease in the percentage of income earned by the poor per century. This means that in proportional terms, a one century increase in colonial rule is associated with a 15.7 percent decrease in earned income for the lowest quintile.

Overall, I find compelling disparate effects of centuries under Spanish administration on the income shares of the rich and poor today, however insufficient evidence exists to establish causality, and cross-national results still indicate that many pooled colonies experience the same opposing effects on income regardless of colonial identity. Instead of detracting from analysis, separating the primary independent variable by colonizer allows for greater specification in determining the most detrimental or helpful institutions and policies for modern-day development. These results suggest that Spanish colonies were not fundamentally different than non-Spanish ones before colonial conquest. Findings are consistent with literature substantiating that the Spanish erected more extractive institutions than their fellow colonizers during colonial

Table 4A. Percentage of Income Held by the Highest Quintile Regressed on Years of Colonization– by Colonial Identity

	(1) Highest Income Quintile	(2) Highest Income Quintile
Centuries Under Spanish Rule	3.130***	3.421**
	(0.699)	(1.235)
Centuries Under American Rule	-1.761	-1.386
	(1.504)	(3.893)
Centuries Under Dutch Rule	0.585	1.068
	(1.513)	(1.713)
Centuries Under British Rule	0.262	-0.655
	(0.808)	(1.229)
Centuries Under French Rule	-1.657	0.216
	(1.746)	(2.457)
Centuries Under Portuguese Rule	0.480	1.972
	(1.004)	(2.249)
Centuries Under German Rule	0.261	-9.787
	(5.147)	(11.76)
Centuries Under Japanese Rule	23.15***	29.72***
	(5.003)	(7.570)
Absolute Value of Latitude	-5.606	-7.009
	(5.474)	(6.012)
Area in Millions of Square Kilometers	0.0246	0.0479
	(0.494)	(0.550)
Country is in Africa	3.619	4.151
	(1.894)	(2.165)
Country is in Asia	-3.686	-3.636
	(1.910)	(2.217)
Dummy for Identity of Colonizers?	NO	YES
Constant	49.12***	48.35***
	(1.823)	(3.100)
Observations	105	105
Adjusted R^2	0.163	0.155

Table 4B. Percentage of Income Held by the Lowest Quintile Regressed on Years of Colonization– by Colonial Identity

	(1) Lowest Income Quintile	(2) Lowest Income Quintile
Centuries Under Spanish Rule	-0.827***	-0.817**
	(0.193)	(0.287)
Centuries Under American Rule	0.351	-0.307
	(0.467)	(0.855)
Centuries Under Dutch Rule	-0.0768	-0.0829
	(0.568)	(0.519)
Centuries Under British Rule	-0.116	-0.0348
	(0.247)	(0.313)
Centuries Under French Rule	0.459	-0.0607
	(0.412)	(0.605)
Centuries Under Portuguese Rule	-0.0564	-0.345
	(0.227)	(0.509)
Centuries Under German Rule	0.0675	0.838
	(1.037)	(2.357)
Centuries Under Japanese Rule	-7.456***	-8.402***
	(1.450)	(1.730)
Absolute Value of Latitude	2.781	3.089*
	(1.401)	(1.529)
Area in Millions of Square Kilometers	-0.0720	-0.0718
	(0.112)	(0.124)
Country is in Africa	-0.302	-0.449
	(0.476)	(0.536)
Country is in Asia	1.544*	1.497*
	(0.647)	(0.704)
Dummy for Identity of Colonizers?	NO	YES
Constant	5.197***	5.679***
	(0.511)	(0.754)
Observations	105	105
Adjusted R^2	0.271	0.247

Standard errors in parentheses.

Source: Original dataset compiled by author, employing data from the United Nations Statistics Division (2021), World Bank's World Development Indicators (2021b), United Nations University World Institute for Development Economics Research (2021), World Bank Agriculture and Rural Development Indicators (2021), La Porta et al. (1999), Feyrer and Sacerdote (2009), Lange et al. (2006), and Ziltener et al. (2016).

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

rule, which harmed the lower indigenous class (Mahoney 2010, Lange et al. 2006). Subsequently, modern day policies perpetuated the extractive institutions which continue to work against the marginalized lower class.

6.3 Further Robustness Checks

Though these analyses yield statistically significant results for both income strata, there may be concern over post-treatment effects of control variables and low measure of fit. Ethnolinguistic fractionalization and legal origin are the most obvious culprits of post-treatment bias, however even geography may have differing effects over time. With more extreme weather due to climate change, and changing technologies which help us better adapt to different climates, the effect of geography on output during the 1700's was likely different than its effect in 2000 and beyond. To better fit the regression line and address post-treatment concerns, I add indicators for economic, political, and social institutions during the period of colonial rule from Ziltener et. al (2016). My primary independent variable, centuries under colonial rule, remains significant in both upper and lower quintile analysis when colonial development indicators are added.

Table 5A illustrates that the positive relationship between colonial rule and the percentage of income earned by the richest quintile remains significantly negative with the inclusion of colonial development indicators. When political, economic, and social institutions are accounted for, a one century increase in time under colonial rule is significantly associated a 2.1 percentage point increase in the percentage of income earned by the richest quintile. Although these additional variables only include observations for countries in Asia, Africa, and Oceania (leaving out nearly all of the Spanish colonies and New World colonies), the measure of fit significantly increases, and the colonialism variable retains significance when variables are included to minimize post-treatment bias. Table 5B illustrates the effect of colonial development

Table 5A. Robustness Check – Institutional Indicators Effect on the Percentage of Income Held by the Highest Income Quintile

	(1) Highest Income Quintile – Economic	(2) Highest Income Quintile – Political	(3) Highest Income Quintile – Social	(4) Highest Income Quintile – All
Centuries Under Colonial Rule	2.078**	1.546*	1.296*	2.120*
	(0.622)	(0.580)	(0.573)	(0.779)
Mining Occurred during Colonial Period	1.503			0.257
	(1.306)			(1.374)
Colonial Foreign Trade Policy	1.868			2.204
	(1.825)			(2.152)
Colonial Investment Concentration	1.848*			1.394
	(0.750)			(0.775)
Colonial Trade Concentration	-2.549*			-3.425**
	(0.951)			(1.179)
Plantations Present during Colonial Period	-1.021			-1.632
	(1.409)			(1.535)
Presence of Colonial Violence		0.930		0.677
		(1.174)		(0.823)
Inherited colonial administration		3.049		1.259
		(2.781)		(2.241)
Colonial Borders Split Ethnic Groups		-0.546		-0.342
		(1.640)		(1.580)
Power Transfer Occurred during Decolonization		-2.658		-3.088
		(1.583)		(1.632)
Missionary Activities during Colonial Period			1.370	-0.267
			(1.032)	(0.993)
Ethnic Function Groups used by Colonial Power			-0.997	-3.125
			(1.469)	(1.855)
Geographic Controls?	YES	YES	YES	YES
Constant	38.38***	43.24***	42.39***	43.40***
	(6.344)	(4.788)	(4.836)	(6.200)
Observations	52	53	52	51
Adjusted R^2	0.304	0.253	0.222	0.346

Table 5B. Robustness Check – Institutional Indicators Effect on the Percentage of Income Held by the Lowest Income Quintile

	(1) Lowest Income Quintile – Economic	(2) Lowest Income Quintile – Political	(3) Lowest Income Quintile – Social	(4) Lowest Income Quintile – All
Centuries Under Colonial Rule	-0.531*	-0.434*	-0.363	-0.571*
	(0.216)	(0.206)	(0.209)	(0.251)
Mining Occurred during Colonial Period	-0.263			-0.152
	(0.307)			(0.354)
Colonial Foreign Trade Policy	-0.325			-0.544
	(0.419)			(0.540)
Colonial Investment Concentration	-0.387			-0.372
	(0.211)			(0.223)
Colonial Trade Concentration	0.672**			0.765*
	(0.222)			(0.298)
Plantations Present during Colonial Period	0.342			0.341
	(0.321)			(0.410)
Presence of Colonial Violence		-0.144		-0.127
		(0.273)		(0.202)
Country Inherited the Colonial Administration		-0.411		-0.176
		(0.677)		(0.539)
Colonial Borders Split Ethnic Groups		0.0174		0.154
		(0.502)		(0.477)
Power Transfer Occurred during Decolonization		0.561		0.661
		(0.401)		(0.396)
Missionary Activities during Colonial Period			-0.217	0.214
			(0.260)	(0.284)
Ethnic Function Groups Used by Colonial Power			0.0327	0.443
			(0.327)	(0.417)
Geographic Controls?	YES	YES	YES	YES
Constant	7.385***	6.514***	6.730***	6.571***
	(1.530)	(1.152)	(1.226)	(1.589)
Observations	52	53	52	51
Adjusted R^2	0.334	0.227	0.196	0.276

Standard errors in parentheses.

Source: Original dataset compiled by author, employing data from the Bank's World Development Indicators (2021b), United Nations University World Institute for Development Economics Research (2021), World Bank Agriculture and Rural Development Indicators (2021), La Porta et al. (1999), Feyrer and Sacerdote (2009), Lange et al. (2006), and Ziltener et al. (2016). Colonial institutions variables presented collected from Ziltener et al. (2016) Colonial Transformation Dataset. See Ziltener et al. (2016) for a more comprehensive description of variables.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

indicators and length of time under colonial rule on the percentage of income earned by the poorest quintile. Centuries under colonial rule maintains its significant negative when all types of institutions are accounted for; a one century increase in time under colonial rule is significantly associated with a -.571 percentage point decrease in the percentage of income earned by the poorest quintile. These results ensure the relevance of my independent variable in previous analyses, as it captures the positive income effect on the rich and negative income effect in the poor even when accounting for colonial-era institutions.

VII. Discussion

In summary, I find a significant positive association between length of time under colonial rule and the percentage of income earned by the highest quintile in 2000, and a negative association between length of time under colonial rule and the percentage of income earned by the lowest quintile in 2000. These relationships are robust to a variety of geographic and institutional controls, both during and after the colonial period. When analyzing the effect of colonial identity on the percentage of income earned by the rich versus poor, the only colonial administrator of significance is Spanish. Centuries under Spanish rule is positive associated with income earned by the rich, and negatively associated with income earned by the poor, consistent with previous analysis.

Despite significant findings, my cross-national regression analysis has several drawbacks. To an extent, the use of centuries under colonial rule as a primary independent variable homogenizes the colonial experience, which could problematize results. The level of colonialism per century is not uniform across every country in my dataset; some countries experienced higher levels of colonialism and henceforth inherited more colonial institutions than others (Lange et al. 2006). The persistent effects of time under colonial rule vary depending on a multitude of factors: when a country was colonized and gained sovereignty, how many foreign settlers were

present during the colonial period, how many indigenous people were present at the onset of colonial rule, the types of institutions the colonial administration imposed. Although length of time under colonial rule is meant to be positively correlated with the number of colonial institutions in a country (since the more time a country spent as a colony, the more entrenched it was with its colonial administrator), it does not perfectly approximate the pertinence of colonial institutions within the nation today. The sequence in Figure 3 and subsequent analysis helps to dispel qualms about the true impact of length of time under colonial rule on disparate economic outcomes today by specifying a causal pathway which supports quantitative results.

Although colonialism is by no means the only channel which affects differences in income today, it is evident that colonialism plays an integral role in disparate outcomes which harm marginalized groups. Future analysis of my findings could better identify who is on average poorer or richer within former colonies. The demographic makeup of the income quintiles is not available in my data sources, however Engerman and Sokoloff (2006) note that colonial settlers came to colonies with substantial amounts of human capital, knowledge of technology, and immunity to endemic disease in comparison to indigenous people[10]. Indigenous people were subjected to harsh labor constraints and lethal maladies; it is estimated that the average New World society in the Americas lost 90 percent of its population a century after European contact (Nunn and Qian 2010). Those that did survive had their property rights withheld, preventing long-run wealth accumulation through the channels discussed above. Meanwhile, white settlers enjoyed economic returns from indigenous labor and better property rights in addition to their human capital advantages upon arriving in the colonies. Further

[10] Europeans had natural immunity to smallpox, measles, and cholera (Nunn and Quian 2010), which they spread to colonial natives. Logically, malaria detrimentally affected European settlers in the tropics, however it did and still does harm natives as well.

analysis could investigate ethnic disparities between income quintiles to determine if they are consistent with Engerman and Sokoloff's (2006) claims.

It is also difficult to ascribe causality to length of time under colonial rule on the percentage of income earned by the rich and poor because many decades have passed since the end of colonialism and the year 2000 for sampled countries. With increasing time between independent and dependent variables observations, more possible explanations emerge for why disparate income effects are observed in former colonies today. Further statistical analysis is required to investigate whether the time since a colony became independent might help or hinder the percentage of income earned by the rich versus poor.

Moreover, the cross-national O.L.S. regression is the simplest of econometric methods; a more persuasive research design would include a relevant and exogenous instrument for number of centuries under colonial rule. Settler mortality rate data is available for a subset of my countries and is used to instrument for colonial institutional quality in Acemoglu et al. (2002). Many instruments conventionally used throughout development literature have been criticized for weakly satisfying the exclusion restriction. An alternative to instrumental variables is a micro-level of analysis on a specific country, or island sample as used by Feyrer and Sacerdote (2009); however, many countries lack appropriate data on income by quintile of the population, and those that do have statistics at a national level often lack data at the sub-national level. Future study could employ the large swaths of time and resources needed to further examine micro-level implications of colonial rule.

While this study contributes to the literature on colonialism and development by identifying disparate effects of time under colonial rule on the income trajectories of the upper versus lower classes, other scholars may utilize these findings as a point of departure to explore the avenues presented above.

VIII. Conclusion

Disparate income effects on the rich and poor persist today through many channels; colonialism is identified in the literature as one mechanism by which extractive institutions continue to undermine economic equity. Colonial extractive institutions prevail through post-independence government policies which benefit an elite group of citizens, henceforth creating positive effects on income for the upper quintile of citizens, and negative effects on income for the bottom quintile of citizens. By identifying how much less income on average is held by the poor today and more income on average is held by the rich, I support a body of literature (Engerman and Sokoloff 2006, Sokoloff and Engerman 2000) which asserts that former colonies have higher levels of income inequality today. Although existing literature examines this relationship qualitatively (Engerman and Sokoloff 2006, Sokoloff and Engerman 2000), this work applies the reasoning and intuition of former scholars to a statistical analysis which supports their theory. Additionally, I synthesize theory to support my quantitative results: that increased length of time under colonial rule established extractive institutions in colonial territories, which led to regressive modern policy. Poor policy is correlated with divergent income trajectories, where there is a significant positive relationship between centuries under colonial rule and the percentage of income earned by the rich, and a negative relationship between the percentage of income earned by the poor. The effect of colonial identity on divergent income trajectories also persists through these channels; institutions erected under Spanish rule in particular are associated with positive income effects on the rich, and negative income effects on the poor.

Since the incidence of colonialism occurred long ago and had encompassing effects on political, economic, and social institutions, it is difficult to precisely measure how colonial institutions affected sampled countries over several centuries of colonial rule. Nonetheless, this

study illustrates a heterogeneity in the net positive association between income and time under colonial rule found by Feyrer and Sacerdote (2009). By splitting their dependent variable (national income) into the percentage of income earned by the rich versus poor, one observes that the percentage of income earned by the rich drives the positive relationship with time under colonial rule, while the poor experienced a decrease in income the longer they experience colonial rule. This is important to note because the aforementioned literature often generalizes development outcomes nationally, even when observable difference in development occur within a country's borders.

Moreover, if research indicates that colonial institutions have positive effects on income, then policy will continue to promote these institutions, leaving the poor at an economic disadvantage. This study hopes to contribute to the literature on colonial institutions and inequality by shedding light on discrepant economic outcomes created by supposedly "successful" institutions. Additional study can further specify unequitable colonial institutions, which allows policymakers to take actions promoting equity for all.

References

Acemoglu, Daron, Simon Johnson and James A. Robinson (2001). "The Colonial Origins of Comparative Development: An Empirical Investigation." *The American Economic Review,* 91: 1369-1401.

Acemoglu, D., Johnson, S., & Robinson, J. A. (2002). Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution. *The Quarterly Journal of Economics*, *117*(4), 1231–1294. https://doi.org/10.1162/003355302320935025

Alesina, A., Baqir, R., & Easterly, W. (1999). Public Goods and Ethnic Divisions. The Quarterly Journal of Economics, 114(4), 1243–1284.

Angeles, L. (2007). Income inequality and colonialism. *European Economic Review*, 51(5), 1155-1176.

Bloom, D. E., & Finlay, J. E. (2009). Demographic change and economic growth in Asia. *Asian Economic Policy Review*, 4(1), 45-64.

Bloom, D. E., Sachs, J. D., Collier, P., & Udry, C. (1998). Geography, Demography, and Economic Growth in Africa. *Brookings Papers on Economic Activity*, *1998*(2), 207–295. https://doi.org/10.2307/2534695.

Banerjee, Abhijit, and Lakshmi Iyer (2005). "History, Institutions, and Economic Performance: The Legacy of Colonial Land Tenure Systems in India." *American Economic Review,* 95(4): 1190-1213.

Benabou, R. (1996). Inequality and growth. *NBER macroeconomics annual*, *11*, 11-74.

Buelens, F., & Marysse, S. (2009). Returns on investments during the colonial era: the case of the Belgian Congo 1. *The Economic History Review*, *62*, 135-166.

Carlos Slim Helu & family. (2021). Forbes. Retrieved November 29, 2021, from https://www.forbes.com/profile/carlos-slim-helu/?sh=4be203c8646b

Coatsworth, J. H. (2008). Inequality, institutions and economic growth in Latin America. *Journal of Latin American Studies*, *40*(3), 545-569.

Cornia, G. A. (2014). Inequality trends and their determinants: Latin America over the period 1990-2010. *Falling inequality in Latin America*, 23-48.

Dell, M. (2010). The persistent effects of Peru's mining *mita*. *Econometrica*, 78(6), 1863-1903.

Dell, M., & Olken, B. A. (2020). The development effects of the extractive colonial economy: The dutch cultivation system in java. *The Review of Economic Studies*, 87(1), 164-203.

Diamond, J. M. (1997). *Guns, germs, and steel*. W.W. Norton and Company.

Dynan, K. E., Skinner, J., & Zeldes, S. P. (2004). Do the rich save more? *Journal of Political Economy*, 112(2), 397-444.

Engerman, Stanley & Sokoloff, Kenneth. (2006). Colonialism, Inequality, and Long-Run Paths of Development. *Understanding Poverty*. 10.1093/0195305191.003.0003.

Easterly, William (2007). Inequality does cause underdevelopment: Insights from a new instrument. *Journal of Development Economics* 84(2): 755-776. Doi: https://doi.org/10.1016/j.jdeveco.2006.11.002.

Feyrer, Janes and Sacerdote, Bruce (2009). Colonialism and Modern Income: Islands as Natural Experiments. *The Review of Economics and Statistics*; 91 (2): 245–262. doi: https://doi.org/10.1162/rest.91.2.245

Frankema, E. H. (2005). *The colonial origins of inequality: Exploring the causes and consequences of land distribution* (No. 119). IAI Discussion Papers.

Frankema, E. (2010). The colonial roots of land inequality: geography, factor endowments, or institutions?. *The Economic History Review*, *63*(2), 418-451.

Gallup, J. L., Sachs, J. D., & Mellinger, A. D. (1999). Geography and Economic Development. International Regional Science Review, 22(2), 179–232. https://doi.org/10.1177/016001799761012334

Hall, R. E., & Jones, C. I. (1999). Why do some countries produce so much more output per worker than others?. *The quarterly journal of economics*, 114(1), 83-116.

Iyer, Lakshmi (2010). Direct versus Indirect Colonial Rule in India: Long-Term Consequences. *The Review of Economics and Statistics*, 92 (4): 693–713. doi: https://doi.org/10.1162/REST_a_00023

Lamb, E. (2012). *Ask gini: How to measure inequality*. Scientific American. Retrieved March 16, 2022, from https://www.scientificamerican.com/article/ask-gini/

Lange, M., Mahoney, J., & vom Hau, M. (2006). Colonialism and Development: A Comparative Analysis of Spanish and British Colonies. *American Journal of Sociology*, *111*(5), 1412–1462. https://doi.org/10.1086/499510

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (1999). The quality of government. *The Journal of Law, Economics, and Organization*, *15*(1), 222-279.

Mahoney, J. (2010). *Colonialism and Postcolonial Development: Spanish America in Comparative Perspective* (Cambridge Studies in Comparative Politics) by James Mahoney (2010-02-15). Cambridge University Press.

Mauro, P. (1995). Corruption and growth. *The quarterly journal of economics*, *110*(3), 681-712.

Milanovic, B. (2016). *Global Inequality: A New Approach for the Age of Globalization* (Illustrated ed.). Cambridge: Harvard University Press.

Mizuno, N., & Okazawa, R. (2009). Colonial Experience and Postcolonial Underdevelopment in Africa. *Public Choice*, 141(3/4), 405-419. Retrieved November 1, 2020, from http://www.jstor.org/stable/40541886

North, D. (1990). *Institutions, Institutional Change and Economic Performance*. Political Economy of Institutions and Decisions. Cambridge: Cambridge University Press. doi:10.1017/CBO9780511808678

North, D. C., Summerhill, W., & Weingast, B. (2000). Order, disorder and economic change: Latin America vs. North America. *Governing for prosperity*, *19*.

Nunn, N. (2009). The importance of history for economic development. *Annu. Rev. Econ.*, *1*(1), 65-92.

Nunn, N., & Qian, N. (2010). The Columbian exchange: A history of disease, food, and ideas. *Journal of Economic Perspectives*, *24*(2), 163-88.

Rodrik, D. (1999). Where did all the growth go? External shocks, social conflict, and growth collapses. *Journal of economic growth*, *4*(4), 385-412.

Rodrik, D., Subramanian, A., & Trebbi, F. (2004). Institutions rule: the primacy of institutions over geography and integration in economic development. Journal of economic growth, 9(2), 131-165.

Romer, P.M. (1990). Endogenous technological change. Journal of political Economy, 95(5, Part 2), S71-S102.

Ross, M. L. (2015). What have we learned about the resource curse?. *Annual Review of Political Science*, *18*, 239-259.

Sachs, J.D. and A. Warner. (1995). "Economic Reform and the Process of Global Integration," Brookings Papers on Economic Activity 1, 1-118.

Sachs, J. D., Mellinger, A. D., & Gallup, J. L. (2001). The geography of poverty and wealth. *Scientific American*, *284*(3), 70-75.

Sachs, J.D. (2001). "Tropical Underdevelopment," National Bureau of Economic Research Working Paper No. w8119.

Sokoloff, K. L., & Engerman, S. L. (2000). Institutions, factor endowments, and paths of development in the new world. *Journal of Economic perspectives*, 14(3), 217-232.

Solow, Robert M. (1956) "A Contribution to the Theory of Economic Growth." *Quarterly Journal of Economics,* 70:65—94.

United Nations Statistics Division (2021). National Accounts Estimates of Main Aggregates: Per capita GDP at current prices – US dollars [Data File]. Retrieved from https://data.un.org/Data.aspx?d=SNAAMA&f=grID%3A101%3BcurrID%3AUSD%3BpcFlag%3A1

UNU-WIDER, World Income Inequality Database (WIID) (2021). Version 31 May 2021. https://doi.org/10.35188/UNU-WIDER/WIID-310521

Wilkinson, Tracy. (2011). *Poverty grew in Mexico to nearly half the population, study finds*. Los Angeles Times. https://www.latimes.com/world/la-xpm-2011-jul-29-la-fg-mexicopoverty-20110730-story.html

World Bank, Agriculture and Rural Development Indicators (2021). Land area (sq. km) [Data file]. Retrieved from https://data.worldbank.org/indicator/AG.LND.TOTL.K2

World Bank, World Development Indicators (2021b). Income share held by highest 20%, Income share held by lowest 20% [Data file]. Retrieved from https://databank.worldbank.org/source/world-development-indicators

Ziltener, Patrick, Daniel Künzler and Andre Walter (2016). Colonial Transformation Dataset [Data file], University of Zurich, 16 June 2016. Retrieved from https://www.worlddevelopment.uzh.ch/en/research/data.html.

Appendix
Replications of Feyrer and Sacerdote (2009)

Outcomes Regressed on Years of Colonization– Replication of Feyrer and Sacerdote (2009)

	(1) Log GDP Capita	(2) Log GDP Capita	(3) Log GDP Capita	(4) Log GDP Capita
Number of centuries a colony	0.420***	0.496***		
	(0.0727)	(0.0987)		
Abs (Latitude)		0.0528***	0.0591***	0.0454***
		(0.0117)	(0.0125)	(0.0120)
Area in millions of sq km		-20.36***	-26.41***	-5.420
		(3.825)	(5.066)	(6.707)
Island is in Pacific		0.760	0.792	0.630
		(0.456)	(0.498)	(0.479)
Island is in Atlantic		0.424	0.469	0.313
		(0.375)	(0.384)	(0.370)
First year a colony			-0.00462***	-0.00372**
			(0.00110)	(0.00110)
Final year a colony				0.0272***
				(0.00455)
Constant	7.472***	6.027***	15.13***	-40.19***
	(0.200)	(0.544)	(1.821)	(9.366)
Observations	81	81	81	81
Adjusted R^2	0.264	0.490	0.447	0.596

Standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Original Dataset

Country	Year	Quintile 1 (Lowest)	Quintile 2	Quintile 3	Quintile 4	Quintile 5 (Highest)	First Year Colony	Last Year Colony	Number Years Colony	Number Centuries Colony	GDP per capita	logGDP per capita	Area in sq km	Area in millions of sq km	Settler Mortality	Abs Latitude	Ethnolinguistic Fractionalization
Algeria	1995	7	11.6	16.2	22.6	42.6	1830	1962	132	1.32	1459.48	7.29	2381740	2.382	78.2	0.3111	0.2937
Angola	2000	3.2	7.8	12.7	20.2	56.1	1576	1975	399	3.99	744.56	6.61	1246700	1.247		0.1367	0.7728
Argentina	2000	3.2	7.6	12.8	21.3	55.2	1580	1819	239	2.39	8357.52	9.03	2736690	2.737	280	0.3778	0.1769
Australia	2001	7.4	12.1	16.4	23.1	40.9	1788	1901	113	1.13	20323.81	9.92	7682300	7.682	68.9	0.3	0.1128
Bangladesh	2005	5.26	9.10	13.13	19.79	52.71	1756	1947	191	1.91	414.48	6.03	130170	0.130	71.41	0.2667	0
Belize	1999	3.2	7.7	12	19.4	57.7	1798	1981	183	1.83	3065.98	8.03	22810	0.023		0.1906	0.4091
Benin	2003	7	10.9	15	20.9	46.2	1878	1960	82	0.82	519.28	6.25	112760	0.113		0.1033	0.6831
Bolivia	2000	1.1	5.3	10.7	18.8	64.2	1538	1825	287	2.87	997.58	6.91	1083300	1.083	71	0.1889	0.5994
Botswana	2002	2.3	4.6	7.8	15.8	69.5	1885	1966	81	0.81	3190.61	8.07	622980	0.623		0.2444	0.3775
Brazil	2001	2.5	6	10.5	18.5	62.5	1500	1825	325	3.25	3164.56	8.06	8358140	8.358	71	0.1111	0.0558
Brunei	2005	6.79	12.44	16.96	23.83	39.98	1888	1984	96	0.96	28926.01	10.27	5270	0.005		0.0478	0.5
Burkina Faso	1998	5.1	8.7	12.1	17.5	56.6	1896	1960	64	0.64	290.56	5.67	273600	0.274		0.1444	0.5467
Burundi	1998	5.1	10.4	15.1	21.5	47.9	1899	1962	63	0.63	144.48	4.97	25680	0.026		0.0367	0.0133
Cape Verde	2001	4.2	7.6	11.7	18.6	58	1462	1975	513	5.13	1469.58	7.29	4030	0.004		0.1778	0.375
Cameroon	2001	6.2	10	14.2	20.6	49	1884	1961	77	0.77	654.20	6.48	472710	0.473	280	0.6667	0.852
Canada	2000	7.1	12.5	17	22.8	40.6	1610	1867	257	2.57	24348.26	10.10	8965590	8.966	16.1	0.6667	0.3762
Central African Republic	2000	2.65	5.95	10.35	18.1	62.9	1890	1960	70	0.7	262.84	5.57	622980	0.623	280	0.0778	0.7856
Chad	2003	6.3	10.4	14.9	21.9	46.5	1900	1960	60	0.6	330.37	5.80	1259200	1.259		0.1667	0.6662
Chile	2000	3.8	7.7	11.8	18.7	58	1541	1818	277	2.77	5107.64	8.54	743532	0.744	68.9	0.3333	0.0506
Colombia	2000	1.9	6.7	11	18.1	62.3	1536	1819	283	2.83	2503.92	7.83	1109500	1.110	71	0.0444	0.0558
Comoros	2004	4	7.3	10.8	16.6	61.4	1886	1974	88	0.88	1275.93	7.15	1861	0.002		0.1344	1
Democratic Republic of Congo	2004	5.7	9.9	14.3	21.6	48.5	1869	1960	91	0.91	472.98	6.16	2267050	2.267	240	0	0.8723
Republic of Congo	2005	4.9	8.6	12.9	20.4	53.3	1880	1960	80	0.8	1752.74	7.47	341500	0.342	240	0.0111	0.6693
Costa Rica	2000	3.9	8.9	13.7	21.5	52.1	1524	1821	297	2.97	3772.91	8.24	51060	0.051	71	0.1111	0.0532
Cote d'Ivoire	2000	6.25	10.7	14.75	21	47.35	1839	1960	121	1.21	649.15	6.48	318000	0.318	668	0.0889	0.8565
Cyprus	2004	8.78	12.98	16.98	22.3	38.96	1878	1960	82	0.82	23773.19	10.08	9240	0.009		0.3889	0.3
Djibouti	2002	6	10.6	15.1	21.8	46.5	1862	1977	115	1.15	789.92	6.67	23180	0.023		0.1256	0.7143
Dominican Republic	2000	3.78	7.74	12.3	20.1	56.2	1493	1821	328	3.28	2828.36	7.95	48310	0.048	130	0.2111	0.0108
Ecuador	2000	3	7	11.2	18.1	60.7	1534	1822	288	2.88	1444.56	7.28	248360	0.248	71	0.0222	0.3254
El Salvador	2000	3.2	7.8	12.7	20.5	55.8	1524	1821	297	2.97	2001.54	7.60	20720	0.021	78.1	0.15	0.0514
Egypt	1999	8.9	12.5	15.8	20.6	42.1	1882	1956	74	0.74	1361.26	7.22	995450	0.995	67.8	0.3	0.0231
Eswatini	2000	4.5	7.5	10.9	17.5	59.5	1894	1968	74	0.74	1728.70	7.46	17200	0.017		0.2922	0
Fiji	2002	6.7	11	15.2	21.7	45.4	1875	1970	95	0.95	2290.21	7.74	450.3	0.000		0.2	0.8
Gabon	2005	5.8	10.1	14.4	21.1	48.7	1885	1960	75	0.75	6888.63	8.84	257670	0.258		0.0111	0.7967
Gambia, The	1998	4.3	8.6	12.9	20.3	53.9	1661	1965	304	3.04	1127.91	7.03	10120	0.010	1470	0.1476	0.7804
Ghana	1998	5.8	10.3	15	22.7	46.2	1874	1957	83	0.83	864.57	6.76	227540	0.228	668	0.0889	0.7061
Grenada	2008	7.26	11.16	14.77	21.18	45.63	1650	1974	324	3.24	7832.44	8.97	340	0.000		0.1341	0
Guatemala	2000	3.5	7.4	11.5	18.5	59.1	1524	1821	297	2.97	1452.50	7.28	107160	0.107	71	0.17	0.4767
Guinea	2002	5.8	9.8	14.1	20.9	49.4	1881	1958	77	0.77	475.14	6.16	245720	0.246	483	0.1222	0.7598
Guinea-Bisseau	2002	7.3	11.8	15.8	22	43.2	1878	1974	96	0.96	325.45	5.79	28120	0.028		0.1333	0.85
Guyana	1998	4.2	9.8	14.5	21.3	50.2	1621	1966	345	3.45	1518.01	7.33	196850	0.197	32.18	0.0556	0.2378
Haiti	2001	2.33	6.15	10.28	17.64	63.59	1492	1804	312	3.12	407.50	6.01	27560	0.028	130	0.2111	0.0644
Honduras	2000	2.4	6.6	11.8	20.3	58.95	1524	1821	297	2.97	1093.21	7.00	111890	0.112	78.1	0.1667	0.0974
Hong Kong	2001	4.00	9.60	14.30	20.90	51.30	1842	1997	155	1.55	25417.87	10.14	1050	0.001	14.9	0.2461	0.2368
India	2004	8.5	12	15.4	20.6	43.5	1773	1947	174	1.74	622.45	6.43	2973190	2.973	48.63	0.2222	0.7422
Indonesia	2000	9.6	13.4	16.8	21.6	38.5	1619	1950	331	3.31	830.69	6.72	1811570	1.812	170	0.0556	0.6906
Jamaica	1999	5.5	9.8	13.9	20.2	50.7	1509	1962	453	4.53	3375.68	8.12	10830	0.011	130	0.2017	0.0125
Kenya	1997	5.6	9.3	13.6	20.2	51.3	1886	1963	77	0.77	508.52	6.23	569140	0.569	145	0.0111	0.827
Kiribati	2006	6.6	11.6	16	21.9	44	1896	1979	83	0.83	1168.47	7.06	810	0.001		0.0139	0.5
Laos	2002	8.6	12.4	16.1	21.3	41.7	1893	1953	60	0.6	347.13	5.85	230800	0.231		0.2	0.25
Lesotho	2002	3	7.5	12.8	21.3	55.4	1869	1966	97	0.97	344.88	5.84	30360	0.030		0.3256	0.2098
Madagascar	2000	5.60	9.55	14.00	21.50	49.35	1896	1960	64	0.64	285.52	5.65	581540	0.582	536.04	0.2222	0.0627
Malawi	2004	6.90	10.70	14.50	20.30	47.50	1891	1964	73	0.73	282.59	5.64	94280	0.094		0.1478	0.6224
Malaysia	2003	4.60	8.70	13.60	21.40	51.70	1786	1957	171	1.71	4461.85	8.40	328550	0.329	17.7	0.0256	0.6104
Maldives	2002	6.8	10.7	14.4	19.4	48.7	1558	1965	407	4.07	3104.59	8.04	300	0.000		0.035	0.0333
Mali	2001	6.3	10.3	14.7	22.2	46.5	1880	1960	80	0.8	307.44	5.73	1220190	1.220	2940	0.1889	0.8086
Malta	2005	9.10	13.70	17.80	23.40	36.00	1798	1964	166	1.66	15799.00	9.67	320	0.000	16.3	0.3944	0.1033
Mauritania	2000	6.20	10.60	15.20	22.30	45.70	1858	1960	102	1.02	676.57	6.52	1030700	1.031	280	0.2222	0.27
Mauritius	2006	7.6	11.7	15.6	21.4	43.8	1638	1968	330	3.3	5723.37	8.65	1873.8	0.002	30.5	0.2241	0.7085
Mexico	2000	3.7	7.6	12	19.1	57.6	1521	1821	300	3	7157.85	8.88	1943950	1.944	71	0.2556	0.1741
Micronesia	2005	5.6	9.8	14.6	21.3	48.7	1899	1986	87	0.87	2361.69	7.77	700	0.001		0.0728	
Morocco	2000	6.5	10.3	14.5	21	47.8	1912	1956	44	0.44	1351.02	7.21	446300	0.446	78.2	0.3556	0.348
Mozambique	2002	5.4	9.3	13	18.7	53.5	1569	1975	406	4.06	302.55	5.71	786380	0.786		0.2017	0.7863

Namibia	2003	3	5.3	8.1	14.5	69	1884	1919	35	0.35	2560.76	7.85	823290	0.823		0.2444	0.7283
Nauru	2013	5.20	11.00	15.90	22.60	45.30	1888	1968	80	0.8	11575.90	9.36	20.7	0.000		0.005	
New Zealand	2001	7.90	11.90	16.40	23.00	40.70	1840	1907	67	0.67	13845.96	9.54	263310	0.263	8.55	0.4556	0.1476
Nicaragua	2001	3.93	7.71	11.83	18.67	57.87	1523	1821	298	2.98	1036.64	6.94	120340	0.120	163.3	0.1444	0.0992
Niger	2005	5.8	9.7	13.7	19.8	51	1897	1960	63	0.63	329.51	5.80	1266700	1.267	400	0.1778	0.7329
Nigeria	2003	5.7	10.4	15.4	22.5	46	1851	1960	109	1.09	795.39	6.68	910770	0.911	2004	0.1111	0.8567
Pakistan	2001	9.4	13	16.3	21.1	40.2	1857	1947	90	0.9	501.92	6.22	770880	0.771	36.99	0.3333	0.6216
Palau	2014	3.00	7.00	12.00	21.00	56.00	1885	1994	109	1.09	13794.79	9.53	460	0.000		0.0735	
Panama	2000	2.1	6.5	11.4	19.8	60.1	1519	1821	302	3.02	3896.61	8.27	74340	0.074	163.3	0.1	0.1908
Papua New Guinea	1996	4.9	8.8	13.5	21.4	51.5	1884	1975	91	0.91	1465.08	7.29	35144.6	0.035		0.0667	0.8027
Paraguay	2000	2.95	7.1	11.85	19.4	58.75	1537	1811	274	2.74	1725.34	7.45	397300	0.397	78.1	0.2556	0.4111
Peru	2000	3.5	8.2	13.6	21.5	53.3	1533	1824	291	2.91	1955.53	7.58	1280000	1.280	71	0.1111	0.4316
Philippines	2000	5.1	8.5	12.7	20	53.7	1565	1946	381	3.81	1038.90	6.95	298170	0.298		0.1444	0.7238
Puerto Rico	1999	2.46	6.69	11.95	19.90	59.00	1493	2021	528	5.28	16026.89	9.68	8870	0.009		0.2017	0.0267
Rwanda	2000	5.2	8.9	12.6	18.4	54.9	1899	1962	63	0.63	260.70	5.56	24670	0.025	280	0.0222	0.0609
Samoa	2002	6.3	10.6	14.5	20.8	47.9	1889	1962	73	0.73	1539.87	7.34	2830	0.003		0.1483	0
Sao Tome and Principe	2000	7.9	12.3	16.6	23	40.2	1493	1975	482	4.82	509.38	6.23	960	0.001		0.0111	0
Senegal	2001	6.6	10.3	14.2	20.5	48.4	1816	1960	144	1.44	628.85	6.44	192530	0.193	164.66	0.1556	0.7789
Sierra Leone	2003	6.6	10.4	14.4	20.7	47.8	1787	1961	174	1.74	266.44	5.59	72180	0.072	483	0.0922	0.813
Singapore	2003	3.99	9.86	15.15	22.98	48.01	1819	1963	144	1.44	23647.63	10.07	670	0.001	17.7	0.0136	0.3215
Solomon Islands	2005	5	9.1	13.3	20.6	52	1893	1978	85	0.85	913.94	6.82	27990	0.028		0.0889	0.5714
Somalia	2002	4.10	8.50	13.60	21.60	52.20	1884	1960	76	0.76	128.32	4.85	627340	0.627		0.1111	0.0791
South Africa	2000	3.1	5.6	9.9	18.8	62.6	1795	1910	115	1.15	3078.56	8.03	1213090	1.213	15.5	0.3222	0.831
Sri Lanka	2002	7	10.5	14.2	20.4	48	1517	1948	431	4.31	1026.77	6.93	62710	0.063	69.8	0.0778	0.3257
Saint Lucia	1995	5.2	9.9	14.8	21.8	48.3	1650	1967	317	3.17	5032.02	8.52	610	0.001		0.1503	0.5833
Sudan	2009	2.99	7.13	11.54	19.55	58.79	1898	1956	58	0.58	1449.48	7.28	2481353.271	2.481	88.2	0.1667	0.5122
Suriname	1999	1.1	6.2	12.2	20	60.5	1667	1975	308	3.08	2401.15	7.78	156000	0.156	32.18	0.0444	0.75
Tanzania	2001	6.90	11.40	15.60	22.00	44.20	1891	1961	70	0.7	336.28	5.82	885800	0.886	145	0.0667	0.8902
Timor-Leste	2001	7.3	11.5	15.6	22.1	43.5	1702	1975	273	2.73	529.79	6.27	14870	0.015		0.0887	
Togo	2006	6.1	9.7	13.9	21.2	49.1	1884	1960	76	0.76	407.69	6.01	54390	0.054	668	0.0889	0.7285
Tonga	2000	6.2	11	15.9	22.6	44.2	1900	1970	70	0.7	1948.91	7.58	720	0.001		0.2222	0
Trinidad and Tobago	1992	5.5	10.3	15.5	22.7	45.9	1687	1976	289	2.89	4410.31	8.39	5130	0.005	85	0.1222	0.2313
Tunisia	2000	6	10.2	14.9	21.7	47.3	1881	1956	75	0.75	2211.86	7.70	155360	0.155	63	0.3778	0.0703
Tuvalu	2010	6.59	10.80	14.95	21.28	46.38	1916	1978	62	0.62	2981.55	8.00	30	0.000		0.0085	
Uganda	2000	3.64	7.33	11.27	17.83	59.93	1894	1962	68	0.68	286.63	5.66	199810	0.200	280	0.0111	0.8358
United States	2000	5.42	10.65	15.68	22.54	45.71	1607	1783	176	1.76	36393.15	10.50	9161920	9.162	15	0.4222	0.209
Uruguay	2000	5.11	9.69	14.70	21.97	48.54	1625	1828	203	2.03	6875.02	8.84	175020	0.175	71	0.3667	0.0667
Vanuatu	2010	6.74	11.14	15.53	21.77	44.81	1887	1980	93	0.93	2966.86	8.00	12190	0.012		0.1778	0.5441
Venezuela	2000	4.70	9.46	14.56	22.13	49.02	1528	1821	293	2.93	4842.28	8.49	882050	0.882	78.1	0.0889	0.0525
Vietnam	2002	7.5	11.2	14.8	21.1	45.4	1859	1945	86	0.86	430.05	6.06	311060	0.311	140	0.1778	0.1176
Zambia	2000	5.2	9.15	13.5	20.6	51.5	1889	1964	75	0.75	345.68	5.85	743390	0.743		0.1667	0.8294
Zimbabwe	1995	0.69	2.80	6.57	13.91	76.02	1888	1980	92	0.92	969.55	6.88	386850	0.387		0.2222	0.5986

Country	Protestant	Catholic	Muslim	Other denomination	English Legal Origin	French Legal Origin	Socialist Legal Origin	Years British	Centuries British	Years French	Centuries French	Years Spanish	Centuries Spanish	Years Dutch	Centuries Dutch	Years Portuguese	Centuries Portuguese	Years American	Centuries American	Years German
Algeria	0	0.5	99.1	0.4	0	1	0	0	0	132	1.32	0	0	0	0	0	0	0	0	0
Angola	19.8	68.7	0	11.5	0	1	0	0	0	0	0	0	0	0	0	399	3.99	0	0	0
Argentina	2.7	91.6	0.2	5.5	0	1	0	0	0	0	0	239	2.39	0	0	0	0	0	0	0
Australia	23.5	29.6	0.2	46.7	1	0	0	113	1.13	0	0	0	0	0	0	0	0	0	0	0
Bangladesh	0.2	0.2	85.9	13.7	1	0	0	191	1.91	0	0	0	0	0	0	0	0	0	0	0
Belize	13.2	66.8	0	20	1	0	0	183	1.83	0	0	0	0	0	0	0	0	0	0	0
Benin	2.8	18.5	15.2	63.5	0	1	0	0	0	82	0.82	0	0	0	0	0	0	0	0	0
Bolivia	2.3	92.5	0	5.2	0	1	0	0	0	0	0	287	2.87	0	0	0	0	0	0	0
Botswana	26.8	9.4	0	63.8	1	0	0	81	0.81	0	0	0	0	0	0	0	0	0	0	0
Brazil	4	87.8	0.1	8.1	0	1	0	0	0	0	0	0	0	0	0	325	3.25	0	0	0
Brunei	1.1	3.2	64.2	31.5	1	0	0	96	0.96	0	0	0	0	0	0	0	0	0	0	0
Burkina Faso	1.6	9	43	46.4	0	1	0	0	0	64	0.64	0	0	0	0	0	0	0	0	0
Burundi	4.9	78.3	0.9	15.9	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	17
Cape Verde	3	95.9	0	1.1	0	1	0	0	0	0	0	0	0	0	0	513	5.13	0	0	0
Cameroon	18.1	35	22	24.9	0	1	0	39	0.39	38	0.38	0	0	0	0	0	0	0	0	38
Canada	29.6	46.6	0.6	23.2	1	0	0	104	1.04	153	1.53	0	0	0	0	0	0	0	0	0
Central African Republic	50	33.1	3.2	13.7	0	1	0	0	0	70	0.7	0	0	0	0	0	0	0	0	0
Chad	11.6	21	44	23.4	0	1	0	0	0	60	0.6	0	0	0	0	0	0	0	0	0
Chile	1.9	82.1	0	16	0	1	0	0	0	0	0	277	2.77	0	0	0	0	0	0	0
Colombia	0.9	96.6	0.2	2.3	0	1	0	0	0	0	0	283	2.83	0	0	0	0	0	0	0
Comoros	0.1	0.1	99.7	0.1	0	1	0	0	0	88	0.88	0	0	0	0	0	0	0	0	0
Democratic Republic of Congo	29	48.4	1.4	21.2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Republic of Congo	24.9	53.9	0.4	20.8	0	1	0	0	0	80	0.8	0	0	0	0	0	0	0	0	0
Costa Rica	5.8	90.5	0	3.7	0	1	0	0	0	0	0	297	2.97	0	0	0	0	0	0	0
Cote d'Ivoire	4.7	18.5	24	52.8	0	1	0	0	0	121	1.21	0	0	0	0	0	0	0	0	0
Cyprus	0.6	1.3	18.5	79.6	1	0	0	82	0.82	0	0	0	0	0	0	0	0	0	0	0
Djibouti	0.2	6.7	90.6	2.5	0	1	0	0	0	115	1.15	0	0	0	0	0	0	0	0	0
Dominican Republic	1.4	96.6	0	2	0	1	0	0	0	8	0.08	319	3.19	0	0	0	0	9	0.09	0
Ecuador	1.9	96.4	0	1.7	0	1	0	0	0	0	0	288	2.88	0	0	0	0	0	0	0
El Salvador	2.4	96.2	0	1.4	0	1	0	0	0	0	0	297	2.97	0	0	0	0	0	0	0
Egypt	0.2	0.2	81.8	17.8	0	1	0	74	0.74	0	0	0	0	0	0	0	0	0	0	0
Eswatini	33.9	10.8	0.1	55.2	1	0	0	74	0.74	0	0	0	0	0	0	0	0	0	0	0
Fiji	39.1	9	7.8	44.1	1	0	0	95	0.95	0	0	0	0	0	0	0	0	0	0	0
Gabon	18.8	65.2	0.8	15.2	0	1	0	0	0	75	0.75	0	0	0	0	0	0	0	0	0
Gambia, The	0.4	1.9	84.8	12.9	1	0	0	304	3.04	0	0	0	0	0	0	0	0	0	0	0
Ghana	25.8	18.7	15.7	39.8	1	0	0	83	0.83	0	0	0	0	0	0	0	0	0	0	0
Grenada	13.2	64.4	0.2	22.2	1	0	0	211	2.11	113	1.13	0	0	0	0	0	0	0	0	0
Guatemala	4.9	94	0	1.1	0	1	0	0	0	0	0	297	2.97	0	0	0	0	0	0	0
Guinea	0.1	1.1	69	29.8	0	1	0	0	0	77	0.77	0	0	0	0	0	0	0	0	0
Guinea-Bisseau	0.6	10.2	38.3	50.9	0	1	0	0	0	0	0	0	0	0	0	96	0.96	0	0	0
Guyana	18	18	9	55	1	0	0	152	1.52	0	0	0	0	193	1.93	0	0	0	0	0
Haiti	12.8	82.6	0	4.6	0	1	0	0	0	175	1.75	133	1.33	0	0	0	0	0	0	0
Honduras	2.6	95.8	0.1	1.5	0	1	0	0	0	0	0	297	2.97	0	0	0	0	0	0	0
Hong Kong	7.5	7.9	0.5	84.1	1	0	0	155	1.55	0	0	0	0	0	0	0	0	0	0	0
India	1.1	1.3	11.6	86	1	0	0	174	1.74	0	0	0	0	0	0	0	0	0	0	0
Indonesia	4.8	2.7	43.4	49.1	0	1	0	0	0	0	0	0	0	331	3.31	0	0	0	0	0
Jamaica	55.5	9.6	0.1	34.8	1	0	0	307	3.07	0	0	146	1.46	0	0	0	0	0	0	0
Kenya	19.3	26.4	6	48.3	1	0	0	77	0.77	0	0	0	0	0	0	0	0	0	0	0
Kiribati	45.3	49	0	5.7	1	0	0	83	0.83	0	0	0	0	0	0	0	0	0	0	0
Laos	0.2	0.8	1	98	0	0	1	0	0	60	0.6	0	0	0	0	0	0	0	0	0
Lesotho	29.8	43.5	0	26.7	1	0	0	97	0.97	0	0	0	0	0	0	0	0	0	0	0
Madagascar	22	26	1.7	50.3	0	1	0	0	0	64	0.64	0	0	0	0	0	0	0	0	0
Malawi	31.5	27.6	16.2	24.7	1	0	0	73	0.73	0	0	0	0	0	0	0	0	0	0	0
Malaysia	1.4	2.8	49.4	46.4	1	0	0	171	1.71	0	0	0	0	0	0	0	0	0	0	0
Maldives	0	0.1	99.9	0	1	0	0	169	1.69	0	0	0	0	223	2.23	15	0.15	0	0	0
Mali	0.2	0.7	80	19.1	0	1	0	0	0	80	0.8	0	0	0	0	0	0	0	0	0
Malta	0.5	97.3	0	2.2	0	1	0	164	1.64	2	0.02	0	0	0	0	0	0	0	0	0
Mauritania	0	0.3	99.4	0.3	0	1	0	0	0	102	1.02	0	0	0	0	0	0	0	0	0
Mauritius	0.9	31.2	16.4	51.5	0	1	0	158	1.58	95	0.95	0	0	77	0.77	0	0	0	0	0
Mexico	1.2	94.7	0	4.1	0	1	0	0	0	0	0	300	3	0	0	0	0	0	0	0
Micronesia	49.2	45.6	0	5.2	1	0	0	0	0	0	0	0	0	0	0	0	0	39	0.39	15
Morocco	0	0.2	99.4	0.4	0	1	0	0	0	44	0.44	44	0.44	0	0	0	0	0	0	0
Mozambique	6.8	31.4	13	48.8	0	1	0	0	0	0	0	0	0	0	0	406	4.06	0	0	0

Namibia	64.2	19.1	0	16.7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35
Nauru	35.4	33.2	0	29				0	0	0	0	0	0	0	0	0	0	0	0	78
New Zealand	37.9	18.7	0	43.4	1	0	0	67	0.67	0	0	0	0	0	0	0	0	0	0	0
Nicaragua	4.4	94.7	0	0.9	0	1	0	0	0	0	0	298	2.98	0	0	0	0	0	0	0
Niger	0	0.2	87.9	11.9	0	1	0	0	0	63	0.63	0	0	0	0	0	0	0	0	0
Nigeria	15.8	12.1	45	27.1	1	0	0	109	1.09	0	0	0	0	0	0	0	0	0	0	0
Pakistan	0.8	0.5	96.8	1.9	1	0	0	90	0.9	0	0	0	0	0	0	0	0	0	0	0
Palau	28.6	41.6	0	29.8				0	0	0	0	14	0.14	0	0	0	0	47	0.47	15
Panama	5.2	85	4.5	5.3	0	1	0	0	0	0	0	302	3.02	0	0	0	0	0	0	0
Papua New Guinea	58.4	32.8	0	8.8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36
Paraguay	1.9	96	0	2.1	0	1	0	0	0	0	0	274	2.74	0	0	0	0	0	0	0
Peru	2.7	95.1	0	2.2	0	1	0	0	0	0	0	291	2.91	0	0	0	0	0	0	0
Philippines	3.8	84.1	4.3	7.8	0	1	0	0	0	0	0	365	3.65	0	0	0	0	48	0.48	0
Puerto Rico	5.1	91.5	0	3.4	0	1	0	0	0	0	0	405	4.05	0	0	0	0	123	1.23	0
Rwanda	11.6	55.6	8.6	24.2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	17
Samoa	76.3	21.3	0	2.4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73
Sao Tome and Principe	2.2	92.4	0	5.4	0	1	0	0	0	0	0	0	0	0	0	482	4.82	0	0	0
Senegal	0.1	5.6	91	3.3	0	1	0	0	0	144	1.44	0	0	0	0	0	0	0	0	0
Sierra Leone	4.8	2.2	39.4	53.6	1	0	0	174	1.74	0	0	0	0	0	0	0	0	0	0	0
Singapore	2.6	4.7	17.4	75.3	1	0	0	144	1.44	0	0	0	0	0	0	0	0	0	0	0
Solomon Islands	39.8	19.1	0	41.1	1	0	0	85	0.85	0	0	0	0	0	0	0	0	0	0	0
Somalia	0	0	99.8	0.2	1	0	0	76	0.76	0	0	0	0	0	0	0	0	0	0	0
South Africa	39	10.4	1.3	49.3	1	0	0	115	1.15	0	0	0	0	0	0	0	0	0	0	0
Sri Lanka	0.4	6.8	7.2	85.6	1	0	0	146	1.46	0	0	0	0	164	1.64	121	1.21	0	0	0
Saint Lucia	6.3	88.3	0	5.4	1	0	0	153	1.53	164	1.64	0	0	0	0	0	0	0	0	0
Sudan	0.1	4.4	73	22.5	1	0	0	58	0.58	0	0	0	0	0	0	0	0	0	0	0
Suriname	36.6	36	13	14.4	0	1	0	17	0.17	0	0	0	0	291	2.91	0	0	0	0	0
Tanzania	11.2	28.2	32.5	28.1	1	0	0	42	0.42	0	0	0	0	0	0	0	0	0	0	28
Timor-Leste	1.2	99.1	0.2	0.2	0	0	0	0	0	0	0	0	0	0	0	273	2.73	0	0	0
Togo	6.1	29.3	17	47.6	0	1	0	38	0.38	38	0.38	0	0	0	0	0	0	0	0	38
Tonga	61.9	17.9	0	20.2	1	0	0	70	0.7	0	0	0	0	0	0	0	0	0	0	0
Trinidad and Tobago	13.2	35.8	6.5	44.5	1	0	0	174	1.74	0	0	115	1.15	0	0	0	0	0	0	0
Tunisia	0	0.1	99.4	0.5	0	1	0	0	0	75	0.75	0	0	0	0	0	0	0	0	0
Tuvalu	93	1	0	6	0	0	0	62	0.62	0	0	0	0	0	0	0	0	0	0	0
Uganda	1.9	49.6	6.6	41.9	1	0	0	62	0.62	0	0	0	0	0	0	0	0	0	0	0
United States	43.6	30	0.8	25.6	1	0	0	176	1.76	0	0	0	0	0	0	0	0	0	0	0
Uruguay	1.9	59.5	0	38.6	0	1	0	0	0	0	0	203	2.03	0	0	0	0	0	0	0
Vanuatu	54.6	16.9	0	28.5	1	0	0	186	1.86	186	1.86	0	0	0	0	0	0	0	0	0
Venezuela	1	94.8	0	4.2	0	1	0	0	0	0	0	293	2.93	0	0	0	0	0	0	0
Vietnam	0.2	3.9	1	94.9	0	0	1	0	0	86	0.86	0	0	0	0	0	0	0	0	0
Zambia	31.9	26.2	0.3	41.6	1	0	0	75	0.75	0	0	0	0	0	0	0	0	0	0	0
Zimbabwe	21.4	14.4	0.9	63.3	1	0	0	92	0.92	0	0	0	0	0	0	0	0	0	0	0

Country	Centuries German	Years Japanese	Centuries Japanese	Years Australian	Centuries Australian	Years Belgium	Centuries Belgium	Years Italian	Centuries Italian	British Dummy	Spanish Dummy	French Dummy	Portuguese Dummy	Dutch Dummy	German Dummy	Belgian Dummy	Landlocked Dummy	Africa Dummy	Asia Dummy	LAC Dummy
Algeria	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
Angola	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
Argentina	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Australia	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Bangladesh	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
Belize	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Benin	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
Bolivia	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1
Botswana	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0
Brazil	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Brunei	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
Burkina Faso	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0
Burundi	0.17	0	0	0	0	46	0.46	0	0	0	0	0	0	0	0	0	1	1	0	0
Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Cameroon	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Central African Republic	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0
Chad	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0
Chile	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Colombia	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Comoros	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
Democratic Republic of Congo	0	0	0	0	0	91	0.91	0	0	0	0	0	0	0	0	1	0	1	0	0
Republic of Congo	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
Costa Rica	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Cote d'Ivoire	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
Cyprus	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Djibouti	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
Dominican Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Ecuador	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
El Salvador	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Egypt	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
Eswatini	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0
Fiji	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Gabon	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
Gambia, The	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
Ghana	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Guatemala	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Guinea	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
Guinea-Bisseau	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
Guyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Haiti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Honduras	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Hong Kong	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
India	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
Indonesia	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0
Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Kenya	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
Kiribati	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Laos	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
Lesotho	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0
Madagascar	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
Malawi	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0
Malaysia	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
Maldives	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Mali	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0
Malta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mauritania	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
Mauritius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Mexico	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Micronesia	0.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Morocco	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Mozambique	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0

Namibia	0.35	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0
Nauru	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
New Zealand	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Nicaragua	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Niger	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0
Nigeria	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
Pakistan	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0
Palau	0.15	33	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panama	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Papua New Guinea	0.36	0	0	25	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paraguay	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1
Peru	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Puerto Rico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rwanda	0.17	0	0	0	0	46	0.46	0	0	0	0	0	0	0	0	0	1	1	0	0
Samoa	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Sao Tome and Principe	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
Senegal	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
Sierra Leone	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
Singapore	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
Solomon Islands	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Somalia	0	0	0	0	0	0	0	45	0.45	0	0	0	0	0	0	0	0	1	0	0
South Africa	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
Sri Lanka	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Saint Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Sudan	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
Suriname	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Tanzania	0.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Timor-Leste	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Togo	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Tonga	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Tunisia	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
Tuvalu	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Uganda	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0
United States	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Uruguay	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Venezuela	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Vietnam	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
Zambia	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0
Zimbabwe	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0